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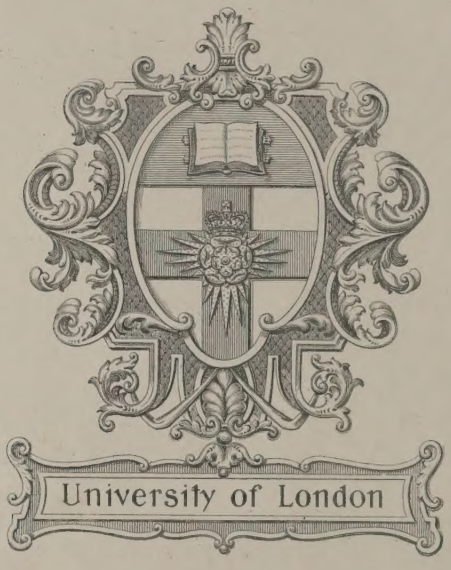
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MINES.

REPORTS

OF

THE INSPECTORS OF MINES,

TO

HER MAJESTY'S SECRETARY OF STATE,

For the Year 1868.

MR. ATKINSON.
MR. DICKINSON.
MR. HIGSON.
MR. EVANS.
MR. WYNNE.
MR. BROUGH.
MR. BAKER.
MR. WALES.
MR. MOORE.
MR. ALEXANDER.
MR. SOUTHERN.
MR. WARDELL.

Presented to both Houses of Parliament by Command of Her Majesty.

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[*Price 5s.*]

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SHOWING

The Number of Male Coal Miners Employed in and about the Coal Mines of Great Britain, the Number of Fatal Accidents and Lives Lost, the Quantity of Coal Raised, and the Proportion of Accidents and Lives Lost to the Number of Persons Employed and the Tons of Coal Raised.

Names of Districts.	Number of Male Coal Miners Employed as per Census 1861.	In the Year 1868.								
		As computed by each Inspector for his own District.		Separate Fatal Accidents.	Lives Lost by the Accidents.	Persons Employed per Separate Fatal Accident.	Persons Employed per Life Lost.	Tons of Coal Raised per Separate Fatal Accident.	Tons of Coal Raised per Life Lost.	Number of Collieries.
		Number of Male Persons Employed.	Quantity of Coal Raised.							
Northumberland, Cumberland, and North Durham	22,719	32,000	11,400,000	67	69	477	463	170,149	165,217	175
South Durham	30,805	37,000	15,300,000	84	87	440	425	182,142	175,862	171
North and East Lancashire	23,525	26,360	7,053,000	61	65	432	405	115,623	108,508	292
West Lancashire and North Wales	24,302	32,000	7,600,000	126	237	254	135	60,317	32,067	208
Yorkshire	31,938	37,000	9,705,000	77	80	480	462	126,039	121,312	459
Derby, Nottingham, Leicester, and Warwickshire	23,434	28,000	7,699,000	58	60	483	466	132,741	128,317	195
North Stafford, Cheshire, and Shropshire	16,427	21,000	6,000,000	57	61	368	344	105,263	98,360	225
South Stafford and Worcestershire	25,235	28,000	9,900,000	90	104	311	269	110,000	95,192	550
Monmouth, Gloucester, Somerset, and Devonshire	21,762	26,000	6,200,000	59	61	441	426	105,084	101,639	201
South Wales	26,292	29,300	9,000,000	100	104	293	281	90,000	86,538	300
Scattered over other Counties	148	—	—	—	—	—	—	—	—	—
Totals,—England and Wales	246,587	296,660	89,857,000	779	928	—	—	—	—	—
East Scotland	18,091	29,000	8,456,084	41	43	707	674	206,246	196,653	254
West Scotland	17,795	21,160	6,253,875	40	40	504	504	156,346	156,346	203
Totals,—Scotland	35,886	50,160	14,709,959	81	83	—	—	—	—	—
Totals and Averages,—England, Wales, and Scotland	282,473	346,820	104,566,959	860	1,011	403	343	121,589	103,429	3,262

SUMMARIES.

Summary of Separate Fatal Accidents in and about the Coal Mines of Great Britain during the Year 1868.

Names of Districts.	Explosions of Fire Damp.	Falls in Mine.			In Shafts.								Miscellaneous Underground.									On Surface.				Gross Totals.
		Falls of Coal.	Falls of Roof.	Total Falls in Mine.	Overwinding.	Ropes and Chains breaking.	Whilst ascending or descending.	Falling into Shaft from Surface.	Things falling from Surface.	Falling from part way down.	Things falling from part way down.	Miscellaneous in Shafts.	Total in Shafts.	Explosions of Gunpowder.	Suffocation by Gases.	Irruptions of Water.	Falling into Water.	On Inclined Planes.	By Trams and Tubs.	By Machinery Underground.	Sundries Underground.	Total Miscellaneous Underground.	By Machinery on Surface.	Boilers bursting.	Miscellaneous on Surface.	Total on Surface.	
Northumberland, Cumberland, and North Durham	3	4	24	28	–	1	7	2	1	3	2	–	16	–	1	–	–	2	10	–	1	14	–	–	6	6	67
South Durham	1	2	33	35	–	–	3	1	–	3	–	3	10	–	–	–	–	7	15	3	–	25	1	2	10	13	84
North and East Lancashire	4	11	22	33	–	–	1	1	–	1	1	2	6	3	1	–	–	2	8	1	–	15	1	–	2	3	61
West Lancashire and North Wales	12	10	48	58	1	–	4	4	–	4	1	4	18	5	1	–	2	6	7	4	–	25	1	–	12	13	126
Yorkshire	5	11	24	35	–	–	2	4	–	2	2	1	11	2	–	–	–	2	8	–	1	13	2	1	10	13	77
Derbyshire, Nottinghamshire, Leicestershire, and Warwickshire	1	7	17	24	–	1	1	–	–	5	1	1	9	7	1	–	–	7	5	–	–	20	1	–	3	4	58
North Staffordshire, Cheshire, and Shropshire	7	10	18	28	–	1	2	2	–	3	–	–	8	1	1	–	–	2	4	–	2	10	3	1	–	4	57
South Staffordshire and Worcestershire	2	41	14	55	1	1	2	5	–	3	1	3	16	–	3	–	–	–	4	–	6	13	1	1	2	4	90
Monmouthshire, Gloucestershire, Somersetshire, and Devonshire	1	10	33	43	2	1	1	–	–	1	–	–	5	3	1	–	–	4	1	–	–	9	–	–	1	1	59
South Wales	3	12	37	49	–	1	5	1	–	–	–	1	8	1	2	–	–	8	21	–	1	33	1	–	6	7	100
Eastern District of Scotland	1	8	16	24	–	1	3	1	–	–	3	–	8	–	–	–	–	–	3	–	2	5	1	1	1	3	41
Western do.	4	9	11	20	–	–	3	3	–	1	–	–	7	2	–	–	–	–	2	1	1	6	1	–	2	3	40
Total Separate Fatal Accidents in 1868	44	135	297	432	4	7	34	24	1	26	11	15	122	24	11	–	2	40	88	9	14	188	13	6	55	74	860
Total Separate Fatal Accidents in 1867	56	145	295	440	10	9	46	32	7	16	4	8	132	28	9	3	3	51	73	5	25	197	14	4	64	82	907
																									Decrease, 1868	47

Summary of Deaths caused by the aforesaid Accidents in and about the Coal Mines of Great Britain during the Year 1868.

Names of Districts.	Explosions of Fire Damp.	Falls in Mine.			In Shafts.									Miscellaneous Underground.									On Surface.				Gross Totals.
		Falls of Coal.	Falls of Roof.	Total Falls in Mine.	Overwinding.	Ropes and Chains breaking.	Whilst ascending or descending.	Falling into Shaft from Surface.	Things falling from Surface.	Falling from part way down.	Things falling from part way down.	Miscellaneous in Shafts.	Total in Shafts.	Explosions of Gunpowder.	Suffocation by Gases.	Irruptions of Water.	Falling into Water.	On Inclined Planes.	By Trams and Tubs.	By Machinery Underground.	Sundries Underground.	Total {Miscellaneous Underground.	By Machinery on Surface.	Boilers bursting.	Miscellaneous on Surface.	Total on Surface.	
Northumberland, Cumberland, and North Durham	3	4	26	30	–	1	7	2	1	3	2	–	16	–	1	–	–	2	10	–	1	14	–	–	6	6	69
South Durham	1	2	34	36	–	–	3	1	–	3	–	3	10	–	–	–	–	7	15	3	–	25	2	3	10	15	87
North and East Lancashire	5	11	22	33	–	–	1	1	–	1	3	2	8	4	1	–	–	2	8	1	–	16	1	–	2	3	65
West Lancashire and North Wales	116	11	51	62	1	–	4	4	–	4	1	4	18	6	3	–	2	6	7	4	–	28	1	–	12	13	237
Yorkshire	6	11	25	36	–	–	2	4	–	2	2	1	11	2	–	–	–	2	8	–	1	13	2	1	11	14	80
Derbyshire, Nottinghamshire, Leicestershire, and Warwickshire	1	7	17	24	–	1	1	–	–	5	1	1	9	8	2	–	–	7	5	–	–	22	1	–	3	4	60
North Staffordshire, Cheshire, and Shropshire	9	10	18	28	–	3	2	2	–	3	–	–	10	1	1	–	–	2	4	–	2	10	3	1	–	4	61
South Staffordshire and Worcestershire	3	43	15	58	1	6	2	5	–	3	1	3	21	–	7	–	–	–	4	–	7	18	1	1	2	4	104
Monmouthshire, Gloucestershire, Somersetshire, and Devonshire	1	10	34	44	2	1	1	–	–	–	1	–	5	4	1	–	–	4	1	–	–	11	–	–	1	1	61
South Wales	4	12	37	49	–	1	5	1	–	–	–	1	8	1	5	–	–	8	21	–	1	36	1	–	6	7	104
Eastern District of Scotland	1	8	17	25	–	2	3	1	–	3	–	–	9	–	–	–	–	–	3	–	2	5	1	1	1	3	43
Western do.	4	9	11	20	–	–	3	3	–	1	–	–	7	2	–	–	–	–	2	1	1	6	1	–	2	3	40
Total Lives Lost in 1868	154	138	307	445	4	15	34	24	1	28	11	15	132	28	21	–	2	40	88	9	15	204	14	7	56	77	1011
Total Lives Lost in 1867	286	147	302	449	22	15	51	33	8	17	4	8	158	31	16	7	3	51	73	5	25	211	14	8	64	86	1190
																									Decrease, 1868		179

SUMMARY of Separate FATAL ACCIDENTS in and about the INSPECTED IRONSTONE MINES of GREAT BRITAIN during the Year 1868.

NAMES OF DISTRICTS.	Explosions of Fire Damp.	Falls in Mine.			In Shafts.								Miscellaneous Underground.									On Surface.				Gross Totals.
		Falls of Ironstone.	Falls of Roof.	Total Falls in Mine.	Overwinding.	Ropes and Chains breaking.	Whilst ascending or descending.	Falling into Shaft from Surface.	Things falling from Surface.	Falling from part way down.	Things falling from part way down.	Miscellaneous in Shafts.	Total in Shafts.	Explosions of Gunpowder.	Suffocation by Gases.	Irruptions of Water.	Falling into Water.	On Inclined Planes.	By Trams and Tubs.	By Machinery Underground.	Sundries Underground.	Total { Miscellaneous Underground.	By Machinery on Surface.	Boilers bursting.	Miscellaneous on Surface.	Total on Surface.	
Northumberland, Cumberland, and North Durham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
South Durham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
North and East Lancashire	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
West Lancashire and North Wales	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Yorkshire	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Derbyshire, Nottinghamshire, Leicestershire, and Warwickshire	–	–	2	2	1	–	1	1	1	–	–	–	4	–	–	–	–	–	–	–	1	1	–	–	–	–	7
North Staffordshire, Cheshire, and Shropshire	2	4	6	10	–	–	3	–	–	1	–	–	4	1	–	–	–	1	1	–	1	4	–	–	1	1	21
South Staffordshire and Worcestershire	–	6	–	6	–	–	1	–	1	–	–	1	3	–	–	–	–	–	–	–	1	1	1	–	–	1	11
Monmouthshire, Gloucestershire, Somersetshire, and Devonshire	–	–	13	13	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	–	3	–	–	–	–	16
South Wales	–	1	5	6	–	–	–	2	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	8
Eastern District of Scotland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	1
Western do.	–	1	1	2	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	1	1	–	–	–	–	4
Total Separate Fatal Accidents - in 1868	2	12	27	39	1	–	5	3	3	1	–	1	14	1	–	–	–	2	3	–	4	10	2	–	1	3	68
Total Separate Fatal Accidents - in 1867	4	15	25	40	–	–	3	5	–	4	3	–	15	4	–	–	–	–	2	–	–	6	–	–	3	3	68
																									Decrease, 1868 -		–

Summary of Deaths caused by the aforesaid Accidents in and about the Inspected Ironstone Mines of Great Britain during the Year 1868.

Names of Districts.	Explosions of Fire Damp.	Falls in Mine.			In Shafts.								Miscellaneous Underground.									On Surface.				Gross Totals.
		Falls of Ironstone.	Falls of Roof.	Total Falls in Mine.	Overwinding.	Ropes and Chains breaking.	Whilst ascending or descending.	Falling into Shaft from Surface.	Things falling from Surface.	Falling from part way down.	Things falling from part way down.	Miscellaneous in Shafts.	Total in Shafts.	Explosions of Gunpowder.	Suffocation by Gases.	Irruptions of Water.	Falling into Water.	On Inclined Planes.	By Trams and Tubs.	By Machinery Underground.	Sundries Underground.	Total Miscellaneous Underground.	By Machinery on Surface.	Boilers bursting.	Miscellaneous on Surface.	Total on Surface.	
Northumberland, Cumberland, and North Durham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
South Durham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
North and East Lancashire	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
West Lancashire and North Wales	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Yorkshire	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Derbyshire, Nottinghamshire, Leicestershire, and Warwickshire	–	–	2	2	1	–	1	1	1	–	–	–	4	–	–	–	–	–	–	–	1	1	–	–	–	–	7
North Staffordshire, Cheshire, and Shropshire	2	4	6	10	–	–	3	–	–	1	–	–	4	2	–	–	–	1	1	–	1	5	–	–	1	1	22
South Staffordshire and Worcestershire	–	6	–	6	–	–	1	–	1	–	–	1	3	–	–	–	–	–	–	–	1	1	1	–	–	1	11
Monmouthshire, Gloucestershire, Somersetshire, and Devonshire	–	–	13	13	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	–	3	–	–	–	–	16
South Wales	–	1	5	6	–	–	–	2	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	8
Eastern District of Scotland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	1
Western do.	–	1	1	2	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	1	1	–	–	–	–	4
Total Lives Lost in 1868	2	12	27	39	1	–	5	3	3	1	–	1	14	2	–	–	–	2	3	–	4	11	2	–	1	3	69
Total Lives Lost in 1867	4	16	25	41	–	–	4	5	–	4	3	–	16	4	–	–	–	–	2	–	–	6	–	–	3	3	70
Decrease, 1868																										1

Mr. Atkinson's Report.

Report on the Inspection of Mines in the South Durham Inspection District, from the 31st December 1867 to the 31st December 1868.—By John J. Atkinson, Esq.

Sir, Chilton Moor, Fence Houses, 28th February 1869.

I have the honour, as Inspector of Mines for the South Durham Mines Inspection District, to report to you, with reference to the operation of the Mines Inspection Acts during the year ending 31st December 1868.

The following Table shows the number of fatal accidents of different kinds, and the number of deaths that have resulted from them, in, at, and about the mines of the district, in each of the years 1864, 1865, 1866, 1867, and 1868; the last being the year embraced by this Report.

	Number of Separate Accidents.					Number of Deaths resulting.				
	Year.					Year.				
	1864.	1865.	1866.	1867.	1868.	1864.	1865.	1866.	1867.	1868.
Explosions of Fire-damp	2	2	2	1	1	3	4	28	1	1
Falls of Coal and Stone.										
Falls of coal	–	1	1	3	2	–	1	1	3	2
Falls of stone	30	20	22	25	33	30	21	22	26	34
Total falls in mine	30	21	23	28	35	30	22	23	29	36
In Shafts.										
Overwinding	–	–	–	–	–	–	–	–	–	–
Ropes or chains breaking	–	1	–	1	–	–	1	–	1	–
Whilst ascending or descending	–	5	3	1	3	–	5	3	1	3
Falling into shaft from top	3	2	–	–	1	3	2	–	–	1
Things falling from top of shaft	2	–	2	–	–	2	–	3	–	–
Falling from part way down	5	–	–	–	3	6	–	–	–	3
Things falling from part way down	–	–	2	–	–	–	–	2	–	–
Sundries in shafts	5	2	4	–	3	5	2	4	–	3
Totals in shafts	15	10	11	2	10	16	10	12	2	10
Miscellaneous Underground.										
Explosions of gunpowder	–	2	1	–	–	–	2	1	–	–
Suffocation by gases	–	–	–	1	–	–	–	–	1	–
Irruptions of water	–	–	–	–	–	–	–	–	–	–
Falling into water	–	–	–	–	–	–	–	–	–	–
On incline and engine planes	5	9	11	11	7	5	9	15	11	7
By trams or tubs underground	16	7	19	14	15	16	7	19	14	15
By machinery do.	2	1	1	–	3	2	1	1	–	3
Sundries underground	1	3	4	1	–	1	6	4	1	–
Total miscellaneous underground	24	22	36	27	25	24	25	40	27	25
Total underground	71	55	72	58	71	73	61	103	59	72
On Surface.										
By machinery on surface	3	4	1	3	1	3	4	1	3	2
By boilers bursting on surface	2	–	1	2	2	6	–	1	4	3
By sundries on surface	7	17	10	11	10	7	17	10	11	10
Total on surface	12	21	12	16	13	16	21	12	18	15
Gross Totals	83	76	84	74	84	89	82	115	77	87

There are very few ironstone mines under the operation of the Mines Inspection Act in this district, and it is gratifying to have to report that no fatal accident has occurred in connexion with them during the past year, 1868.

It may be observed from the preceding tabular statement that only one death has taken place during the past year from the explosion of fire-damp in the district; this, too, is a comparatively satisfactory result; and when it is considered that a greater quantity of coal is raised in this than is raised in any other district, and that many of the seams of coal in it are of a fiery character, while, from the great engineering difficulties and the great expenses attending the sinking of shafts in the eastern part of the district, very large areas of coal are worked by each colliery, involving, of course, proportionally great preparations and outlay to produce proper ventilation at long distances from the shafts, such a result, in my opinion, reflects very great credit upon the owners and managers of the mines of the district; a result only atttainable by very great care and liberality of outlay, and a rigid enforcement of discipline amongst the work people; and the same result naturally reflects a degree of credit upon the men and boys, who so generally submit to the discipline imposed upon them, notwithstanding the exceptions to the rule.

The number of deaths caused by falls of coal and of stone in the district has been greater than usual during the past year, thirty-six persons having been killed, through thirty-five accidents, one of which, a fall of stone in the broken or pillar workings at Brancepeth Colliery caused the deaths of two persons, both of whom were coal hewers. The average number of deaths from this class of accidents during the preceding four years (embraced by the table) was only twenty-six, the increase beyond this number during the past year being nearly thirty-eight and a half per cent.

It is difficult to assign any truly satisfactory reason for the great yearly variations in the yearly number of deaths caused by this particular class of accidents; but I imagine that sudden changes in the state of the atmosphere as to pressure, moisture or dryness, and as to temperature, has more or less influence upon the strata forming the roofs of working places and roads, and may, to some extent, account for them; falls of roof being apt to occur from sudden changes in the state of the atmosphere.

In my last annual report I only had to allude to two deaths as having been caused by shaft accidents during the previous year, 1867, compared with an average number of 13 deaths per year during the four preceding years, and in that report I ventured to express a hope that, for reasons assigned, some considerable reduction in the amount of fatality from this class of accidents might be permanently maintained.

I regret to have to state that during the past year, 1868, ten persons have lost their lives through shaft accidents, which is just equal to the average loss of life from the same class of accidents during the preceding four years that are embraced by the tabular statement.

During the year 1868, accidents of a miscellaneous character (but consisting chiefly of crushes by coal tubs) in the mines of the district caused the deaths of twenty-five persons, each by a separate accident, 29 being the average of the preceding 4 years.

On the whole the deaths that have resulted from underground accidents in the mines of the district during the past year have been 72 in number, compared with an average number of 74 per year during the preceding four years which are included in the tabular statement.

The deaths that have been caused by accidents on the surface, at and about the mines of the district, during the past year, have been 15 in number, whereas on the average of the four preceding years embraced by the table, the number was nearly 17; the reduction being but slight.

On the whole (inclusive of deaths caused by both under-ground and above-ground accidents, in, at, and about the mines of the district) the number during the past year has amounted to 87, whereas on the average of the four preceding years the number per year was 90¾, so that altogether this gives a reduction of upwards of four per cent. in the number of deaths as compared with the preceding four years included in the table.

During the past year three of the accidents in connexion with the mines of the district have resulted in the deaths of two persons each, one of such accidents being a fall of stone, another being through entanglement with machinery connected with a small coal apparatus on the surface, one of the victims in this case becoming entangled while he was endeavouring to rescue the other; this took place at Framwellgate Colliery in March 1868. The third accident which caused the deaths of two persons happened at Kelloe Winning, through the bursting of a boiler there. The whole of the other accidents at the mines of the district in the year 1868 each resulted in the death of a single person only.

A detailed list of the fatal accidents and of the deaths that have resulted from them during the past year 1868 is appended to this report, and prefixed to it are summaries in which the fatal accidents, and the deaths resulting from them, are classified, both as regards the coal mines, and separately as regards the ironstone mines coming within the scope of the Mines Inspection Act, in each of the twelve inspection districts into which Great Britain is divided.

There is also prefixed to this report a return showing separately for each of the twelve inspection districts into which Great Britain is divided the number of male persons employed in, at, and about the coal mines, the quantity of coal raised, the number of fatal accidents, and the number of deaths that have resulted from such accidents; and also the number of persons employed per fatal accident, the number of persons employed per life lost, the tons of coal raised per fatal accident and per life lost through such accidents, and the number of collieries.

The following comparative statement is extracted from the last-mentioned return.

1868.	The whole of Great Britain.	The South Durham Inspection District.
Computed number of persons employed; on census basis	346,820	37,000
Computed quantity of coal raised, in tons	104,566,959	15,300,000
Number of fatal accidents	860	84
Number of lives lost by such accidents	1,011	87
Number of persons employed per fatal accident	403	440
Number of persons employed per life lost by fatal accident	343	425
Tons of coals raised per separate fatal accident	121,589	182,142
Tons of coals raised per life lost by accidents	103,429	175,862
Number of collieries in the district	3,291	171

Fatal Explosion of Fire-damp.

As happened in 1867, and as was mentioned in my report of last year, I may here repeat with respect to the year 1868, that only one explosion of fire-damp in the mines of the district during the past year has proved fatal to life, and even in this solitary case no other person than the unfortunate victim, Joseph Palmer, an onsetter, twenty-three years of age, was injured by it.

It occurred on the 7th August 1868, at the new pit at Thrislington Colliery, the shaft of which had only a short time previously been sunk from the surface down to the Harvey seam of coal. A furnace had been placed on the surface, close to the top of the shaft, for the purpose of ventilation, while the shaft holings and other preliminary operations were being carried out before commencing the ordinary working of coal. The surface furnace was surmounted by a chimney. In one direction in the mine a considerable amount of fire-damp had been given off (south-westwards from the shaft), where the rising of the seam of coal was at the rate of about six inches in the yard, and of necessity had to be ventilated by means of brattice; but this had been driven so as to open a communication between the two compartments (downcast and upcast) of the shaft, about three weeks before the explosion took place.

After the completion of this communication between the down-cast and the up-cast divisions of the shaft the sinkers had been employed in putting guides into the shaft, and raising the water from the sump at the shaft bottom.

About ten o'clock on the night of the 6th August some permanent brattice was substituted for the temporary brattice near the bottom of the shaft, which would naturally have the effect of lessening the leakage of air at that part, and of causing a stronger current to pass through the few workings in the seam of coal.

The onsetter Palmer went, as usual, to guide the water tub, near the sump, at the bottom of the shaft, and he was the only man in the mine at the time when the explosion took place.

A deputy overman examined the workings at ten P. M., and reported to the master sinker, in the presence of Palmer (but not to the overman), that he had observed fire-damp resting in a wedge shape up the south-west holing. About 1. 15. A. M. on the following morning (the 7th August) the banksman observed a flash of flame come out of the furnace chimney, and a few seconds afterwards he heard an explosion in the up-cast shaft, which proved to have blown out a considerable quantity of the brattice separating the down-cast from the up-cast compartments of the shaft. The onsetter was

employed at the bottom of the down-cast division of the shaft, and had no naked light, but only a safety lamp; so that the explosion almost certainly originated at the ventilating furnace on the surface.

I may here mention that I had previously obtained a promise from Mr. Wood the manager that he would open out the seam of coal with safety lamps only, notwithstanding his stating to me at the time that the seam was, so far, very free from fire-damp, and that I was not aware of a furnace having been adopted to ventilate the mine until I received notice of the explosion having occurred.

When the top of the fallen brattice and of other materials was reached at the lower part of the shaft, on the 8th August after the explosion, the onsetter was found sitting upon it, not burnt but quite dead, probably from suffocation by the after-damp resulting from the explosion.

At the inquest Mr. Wood the manager stated that he had adopted the furnace as a temporary means of producing ventilation, thinking it safe to do so as no fire-damp had then been observed.

That a feeder of fire-damp was, however, encountered after driving about 50 yards to the rise of the seam.

That the workings of the mine might become foul during the time the workmen were replacing the temporary brattice by the permanent brattice near the bottom of the shaft, and that the extra pressure of air laid upon the workings after substituting the permanent for the temporary brattice might have the effect of bringing off any previous accumulation of fire-damp, and that this might be ignited at the furnace at the top of the shaft and so cause the explosion.

Under the circumstances he stated that he thought that Raisbeck, the overman, who resides at the colliery and had charge of it in his absence, ought to have watched with a safety lamp the state of the return air near the shaft; and that if he had found it to be explosive he ought to have had it diluted with fresh air, by opening a door separating it from the intake fresh air, so as to have prevented an explosive current from ascending the shaft and reaching the furnace there.

Mr. Wood did not reside at the place and was not aware of the hourly changes and operations going on at this particular colliery, he having the charge of several others.

Similar views to the above were given by Mr. Armstrong of Wingate, and by Mr. Joseph Smith, in their evidence, both being managers of neighbouring collieries.

John Scarth, a chargeman over sinkers, Richard Brown, a banksman, and Matthew Raisbeck, an overman, were each examined at the inquest.

In this case I think that Matthew Raisbeck showed a want of judgment in not watching, or sending some one to watch, the state of the return air near the bottom of the shaft, while the replacing of the temporary brattice by permanent brattice at the shaft bottom was in progress; and, if I mistake not, the deceased onsetter, Joseph Palmer, was his son-in-law. I also consider that it was imprudent, under the circumstances, to have employed a furnace, even on the surface, to produce ventilation; and that a water-fall in the downcast shaft, or, in its absence, a small ventilating fan or air pump, ought to have been employed for the purpose of opening out the mine.

The jury after hearing all the evidence returned a verdict of accidental death.

Falls of Coal and Roof.

In the coal mines of the district, during the past year, two deaths have resulted from falls of coal, and thirty-four from falls of stone and roof, making a total of thirty-six deaths from this class of accidents.

The occupations of the victims were as follows:—

By falls of stone and roof:		
Coal hewers	23	
Deputies	5	
Putters	4	
Shifter	1	
Stone workman	1	
	—	34
By falls of coal:		
Coal hewers		2
	—	—
Total		36

Although this amount of fatality from falls of stone and coal is considerably greater than the average amount for this district during the twelve years ending 31st December 1867 (see page 3 of my last annual report,) yet it was exceeded in the years 1859 and 1863, in each of which years there were forty deaths from the same class of accidents; the quantity of coal raised, however, was considerably smaller in amount upon an average of these years than it was during she past year

I have little reason to attribute the marked differences in the number of deaths caused by falls of stone and roof to any other cause than to atmospherical conditions and changes being different and more or less favourable during some years than they are during others, as, for the most part, the persons in charge are the same, and the systems of working the mines but litte altered from year to year.

Occasionally, however, it may be that from an extra demand for coal there may be an influx of unpractised workmen into the mines, resulting in an increase of this class of accidents, from the want of experience on the part of the new workmen employed.

It may be seen, by a reference to a table at page 15 in my last annual report, that the yearly proportional variations in the number of deaths caused by this class of accidents become smaller as they apply to wider areas and to a larger number of collieries, the whole of Great Britain giving much smaller proportional variations in their number from year to year, over a period of ten years embraced by the table, than are exhibited by the numbers for the South Durham district alone, during the same years in that table.

In my last annual report (page 7) I stated my opinion as to the causes of the deaths from this class of accidents having in this district during a period of twelve years been less than one half of the number, in proportion to the quantity of coal raised, than occurred in the whole of the coal mines of Great Britain.

I beg to remark upon some of the accidents from falls of coal and stone. No. 2 accident in the list occurred while the sufferer with others was engaged in setting timber to support the roof, the master shifter, who was within a few yards of the place and in charge of the work, having detected no danger.

No. 4 accident in the annexed list caused the death of a putter, who had improperly exchanged employment at the time with the hewer in whose place it occurred. The place had been examined by the overman, who had not apprehended any danger.

No. 7 accident occurred in a place which was closely timbered towards the working face; the brother-in-law of the sufferer worked in the same place, and they had no apprehension of danger previous to the accident.

No. 23 accident occurred within a few minutes after the deputy had left the place, and deceased, it appears, had complained of the deputy having put in too much timber near the face of the place, as being a hindrance to his getting worked.

No. 33 accident in the list caused me to suggest a regulation which I hope may have a tendency to prevent similar accidents, under like circumstances, in future.

No. 36 accident occurred while a deputy was in the place fixing timber for the further support of the roof.

No. 37 accident caused the death of a deputy while he was engaged in removing a prop.

No. 44, like No. 4 accident, resulted in the death of a putter, who was improperly hewing coal in lieu of attending to his own duties.

No. 53 accident caused the deaths of two coal hewers, although a deputy had examined the place, and put in timber for the support of the roof, only about ten minutes before the fall occurred, and one of the sufferers by the accident (as in No. 23 accident) had complained to the deputy of his having put in too much timber for the purpose, and during the short time that elapsed between the deputy leaving the place and the occurrence of the accident one of the sufferers was observed by a putter to be apparently in the act of removing one of the props which the deputy had just put in to support the roof, and it appears to be probable that this act caused the fatal fall of stone to take place.

No. 72 accident occurred in a place which had been visited by the overman of the pit a few hours previously, and later still by one of his deputies, who had put in additional timber for the support of the roof, and had left loose timber to be used in case of need.

No. 73 and No. 83 accidents in the list each caused the death of a deputy overman while removing timber where the roof was no longer required to be supported for the purpose of working the coal.

I may conclude my remarks on this painful subject by observing, as I have done in former reports, that the fatality arising from this class of accidents is much higher amongst the deputy overmen, who are employed to protect the lives of the ordinary

workmen, than amongst the workmen themselves; the occupation of deputies is of a highly dangerous character, and I would once again urge upon them the necessity of looking to their own personal safety, at the same time that they do not neglect to attend to that of others.

Fatal Accidents in Shafts.

During the past year ten separate fatal accidents have occurred in the shafts of the coal mines of the district, each causing the death of a single person.

Although this amount of fatality is greater than I anticipated in my last report it is slightly below the average of the last ten or twelve years, and is considerably less than the average number of deaths from the same class of accidents (in proportion to the quantity of coal raised) in the whole of the mines of Great Britain.

No. 6 accident in the list consisted of the sufferer being crushed while ascending the shaft, but there was nothing to show in what manner he had received his injuries; it was an ordinary cage that he was in, no person being along with him.

No. 24 accident was the case of a workman, while descending a series of 14 ladders in a shaft by which the workmen enter and leave the mine. The deceased appears to have thought that he had reached the bottom of the shaft when he was the height of either one or two ladders' lengths above it, and so to have slipped down and rolled or fallen to the bottom of the shaft.

No. 41 accident in the list caused the death of a coal hewer, who fell out of an iron tub, in which he, along with another hewer, was being lowered from the main coal down to the low main coal seam. The tub in the first place appears to have been caught and suspended by a slightly projecting skating or guiding deal end; its descent being thus arrested some slack chain at the low end of the winding rope appears to have accumulated, and after this the tub appears to have become liberated and to have fallen away, the jerk causing the deceased to lose his hold and to fall out of the tub, and to the bottom of the shaft, causing his death.

It appears to be probable that they had not placed themselves properly in the tub, so as to balance and keep it in a vertical position, owing to which it probably was caught by the projecting end of the guiding or skating deal; the depth which the victim would fall would be about 20 fathoms.

The main coal seam, from near the level of which the deceased fell, had, until very shortly before the accident, been the lowest seam of coal that had been worked at the colliery, and as the low main coal seam at a depth of about 20 fathoms beneath it had only been sunk to a short time previously, the application of guides and cages had not, at the time of the occurrence, been introduced between the two seams, and hence the ordinary mode of ascending and descending in such cases by means of a tub was in use at the time.

No. 43 accident in the list was the case of a coal hewer, who had been engaged in driving the shaft holings within three yards of the bottom of the shaft, by some unknown means falling into the sump, a receptacle for water, being a continuation in depth of the shaft, below the seam of coal in which he was employed. The coals having all been cleared away, the onsetter removed the cover of the sump for the purpose of having the water drawn out of it, and he states that he had told the deceased of his having done so, yet he had by some means fallen through the hole into the sump, and was there drowned.

No. 48 accident in the list occurred at a self acting drop staple, and caused the death of the onsetter, who was employed at the bottom of the staple.

It appears that he had put some timber into the cage at the bottom of the staple (which is 11 fathoms in depth), and then called up to the brakesman at the top of the staple to have it drawn up, but that a part of the timber, which had projected from the cage, came into contact with some of the timber fixed in the staple, and arrested the ascent of the cage near to the bottom of the staple. The onsetter then went up ladders which were fixed in the staple, and liberated the cage which was again put into motion; but the timber in the cage, for the second time, came into contact with fixed timber, a little higher up the staple, and the onsetter again went up the ladder to liberate it, and afterwards called to the brakesman to raise the cage while he was beside it; on the cage being again put into motion it was almost directly arrested, for the third time, in its ascent, and on the brakesman coming down the ladders he found the onsetter's head jammed between one of the cross timbers fixed in the staple and the cage.

The timber put into the cage by the victim of the accident ought to have been tied so as to prevent it from projecting, and even in the absence of that ordinary precaution,

with proper care he need not have lost his life, if we assume the evidence to be correct as to his ordering the cage to be raised after freeing it the second time, and I saw no reason to doubt its correctness.

No. 49 accident in the list resulted in the death of a young man who had imprudently put himself into a position of danger near the top of a shaft to call down to another person as to the meaning of some misunderstood signals, and it being night, and he not within sight of the brakesman, whom he had not told where he was going, the brakesman lowered the cage, which crushed the deceased against a fixed timber by the side of the shaft, over which his head had projected into the shaft. There was proper signalling apparatus at the shaft, and deceased ought not to have placed himself in danger to call down.

No. 63 accident caused the death of a shaftsman, who having lost a lamp off a cradle part of the way down the shaft, got himself lowered down by a clumsy arrangement, and after recovering the lamp and being drawn up again by the same means, the hook of the loop in which he was sitting lifted a cross timber in the shaft over which the rope was sliding; this timber afterwards appears to have fallen upon him, and knocked him out of the loop, and caused him to fall to the bottom of the shaft and into the sump, a distance of nearly 40 fathoms.

No 64 accident resulted in the death of a youth, who fell into the cage hole at the bottom of the shaft through his feet slipping on the smooth flat sheets; the cage came down the shaft upon him immediately, in its ordinary course, and so crushed him that he died.

No. 74 accident caused the death of a deputy overman. He was in the act of getting into a shaft cage, after two other men were in, to descend the shaft, at the time when the descent of the cage commenced, and he fell down the shaft in consequence.

The movement of the cage appears to have arisen from a mistake on the part of the engineman, who states that he heard some one call for him to lower the cage, and that he could not see the men getting into the cage. They were getting into the cage at the level of the railway branches, a practice which had been long pursued by men going down the shaft at nights, but which was contrary to the orders of the viewer, and without his knowledge. It seems probable that the engineman had mistaken the source of a call, which he states that he heard, as there were other persons within a short distance who might have called one to the other "how way," and this to the engineman, if he thought it came from the banksman, would lead him (the engineman) to think that the lowering of the cage was required.

It was on the evening of a windy November day, and steam from the adjacent boilers was calculated to obscure his view of what was going on. Orders have been repeated, and I believe fully enforced, as to men not being allowed to get into the cages at the level of the railway branches, since this accident.

No. 79 accident was caused by a small piece of timber falling from a loop whilst being drawn up a new shaft, and striking the sufferer, who was engaged at the bottom of the shaft. It would appear that the small piece of timber had been by some oversight sent away from the bottom of the shalf on the point of the hook, and that it had dropped off on coming into contact with the side of the shaft after it had been raised for some distance from the bottom.

The timber or board was used for securing building stones in being lowered down the shaft for masonry that was in progress there.

As a majority of the shaft accidents appears to have been more or less due to a want of proper care on the part of the sufferers themselves, and the others appear to have been so purely accidental, I refrain from further remarks on the subject, beyond pointing out how very careful and guarded every one ought to be while ascending or descending, or while they are employed in or about the shafts and underground staples of mines.

I have in previous reports pointed out many matters which ought to be attended to, with a view of preventing accidents in such situations.

Miscellaneous Underground Accidents.

Twenty-five accidents of this class have each caused the death of one person in the mines of the district during the past year, being slightly below the average of the preceding four years embraced by the table.

The deaths from being crushed by coal tubs on self-acting inclined and engine planes in the mines have only been seven in number during the past year, compared with an average of 10 deaths per year from the same class of accidents during the preceding four years embraced by the table.

During the past year 15 deaths have resulted from crushes by tubs on the ordinary tubways in the mines, being one more than the average number of deaths per year from the same kind of accidents during the preceding four years embraced by the table.

Three deaths have been caused by underground machinery during the past year, whereas one death per year was the average number over the preceding four years embraced by the table.

There have been no deaths during the past year from explosions of blasting powder or suffocation by gases.

The victims of this class of accidents include persons of various occupations; they stand thus for the past year,—

Rolleywaymen	2
Drivers	4
Putters	7
Hooker-on	1
Helper-up	1
Shifter	1
Sheave greaser	1
Hewers	2
Horsekeepers	2
Onsetter	1
Trapper	1
Landing boy	1
Brakesman	1
Total	25

The putters in the low and extreme part of the workings of the mines, who for the most part are engaged in driving small ponies, are the principal sufferers; and the horse drivers in the horse roads of the mines are the next in order.

I do not see any necessity for giving the details of these accidents, as they are so varied in their character and occur to so many different classes of persons and under such a variety of circumstances that it is difficult if not impossible to draw any further general conclusions as to precautions intended to avoid their occurrence in future beyond such as have from time to time been mentioned in my previous annual reports.

The crushes by tubs sometimes arise from horses taking fright, switches being wrong, putters not keeping their heads down in low parts of the mine, signalling for full tubs to be set away from the tops of inclined planes before hooking the empty ones to the rope at the bottom, wrong or misunderstood signalling, getting upon tubs while in motion, and being met or overtaken by engine trains without getting into refuge holes in time; other accidents occur from being struck by the handles of winches used for changing ropes where the engine plane roads of a mine separate, getting entangled in the machinery of underground engines, and from numerous other miscellaneous causes.

As every case of death from mine accidents is carefully inquired into before a coroner and jury, and as it seldom happens that a verdict of manslaughter is returned, and only occasionally that any censure is expressed, it may be assumed that although there is more natural danger in mines than on the surface, yet that agents and workmen in mines are not more guilty of crime, neglect, or disobedience while they are in mines than when they are on the surface; and that if these accidents are to be to any considerable extent reduced in the frequency of their occurrence it must be by improved modes of conducting the transit of coal, and of other underground operations, rather than by any considerable extension of the Acts of Parliament for the regulation and inspection of mines or of the general or special rules framed under their authority.

Aboveground Accidents.

The deaths that have resulted from accidents upon the surface at the mines of the district during the past year have been 15 in number, compared with an average number of 16¾ per year during the four preceding years embraced by the table; so that their number has been slightly below that average.

The occupations of the sufferers were of various kinds, but I may mention that four of the sufferers were employed as screenmen, and were crushed by waggons and trucks at or near to the coal screens.

In one case a boiler explosion caused the death of a single person, and in another case a boiler explosion caused the deaths of two persons.

In another case two persons were crushed by machinery employed for the purpose of separating the small coals from the dust and refuse.

Boiler Explosions.

No. 29 accident in the list arose from the explosion of a boiler, which caused the death of an engineman who was about to relieve his fellow engineman, but had not taken charge of the engine at the time when the explosion took place.

After a careful inspection of the parts of the exploded boiler I attended the inquest, when the following statements were elicited.

William Speed was the brakesman or engineman in charge at the time of the explosion; John Swinney was the colliery engineer, and had the general charge of the boilers, to see that they were sufficient and kept in proper repair, and John Porter was the foreman blacksmith who superintended the execution of such repairs.

The steam was heard to be blowing off at the safety valves immediately before the explosion took place; the deceased was found between the 3d and 4th boilers, reckoning from the engine-house; he was dead, having been injured about his brow; he had been bleeding, but was blackened when found amongst the wreck about half an hour after the explosion. Deceased had been seen going towards the boiler fire holes a few minutes before the explosion occurred.

The explosion took place about 4 A.M. on the 4th of April.

At the colliery there were 4 boilers placed side by side, numbered 1, 2, 3, and 4, respectively, No. 1 being the one next to the side of the engine house.

It was No. 2 boiler, the 2d one from the engine house, which exploded.

There were two floats and two safety valves (one $3\frac{1}{2}$ and the other $3\frac{7}{8}$ inches in diameter) in connexion with each of the boilers. Each boiler had an unplugging apparatus and a feed pipe and valve, but there was not a valve to prevent the water being thrown out of one boiler into another through the feed pipe.

The boiler was cylindrical, and had hemispherical ends; it was 28 feet in length over the ends, and was constructed of plates $\frac{3}{8}$ths of an inch in thickness, and they were found to be of nearly their primitive thickness along the lines of fracture. The boiler had been constructed by the Birtley Iron Company, the owners of the colliery, and had been in use about 29 years. The plates had cracked and had been patched in some parts. The boiler had been repaired on several occasions, but the fractures did not pass through any of the patches. A model of the boiler showing the seams, lines of fracture, and the position of the fittings was exhibited at the inquest.

The boilers were fed with water from the mine and deposit a thin hard incrustation, but they were cleaned once a month. There was nothing amiss with the feed apparatus. The water was heated before being sent into the boilers.

The most recent repairs to the boiler were made about 4 days before the explosion took place. Flash flues and external firing were employed.

The steam jug was found to have had its valve open, so that the exploded boiler would have a steam communication with the other boilers and with their safety valves at the time of the explosion.

The ordinary working pressure was 30 lbs. per square inch, and the valve weights required to be at the ends of the levers to get this pressure upon the valves. The exploded boiler was filled on the First of April after being repaired, and was boiled the next morning, and the steam raised to its working pressure. Daily sludging was practised. The feed valve was closed at the time of the explosion. The boilers were fed by a donkey engine. Some of the plates forming the boiler appeared to be crystallized, and more or less brittle and deteriorated by long use or exposure to the heated air and gases from the fire. There were no appearances to indicate that there had been any want of water in the boiler, or overheating of the plates composing it.

My opinion as to this boiler explosion is, that it occurred under the usual or ordinary working pressure at a longitudinal seam where an old crack, about 10 inches in length, was discovered (after the explosion) to have existed in the plate, but which does not appear to have been detected previous to the explosion. In pinning some of the rivet holes when repairing the boiler immediately before the explosion I think it highly probable that the plate had been further weakened at this old crack, and that to such an extent as to render the boiler incapable of sustaining the working pressure, so that it exploded as soon as the steam was got up and that pressure was brought upon it.

There appeared, from the evidence, to have been no leakage at the old crack to lead to its detection previous to the explosion, and hence it had probably not extended through the entire thickness of the plate.

No. 45 accident in the list was also a case of boiler explosion ; it caused the deaths of two persons, and occurred at about 20 minutes after 7 o'clock P.M. on the 8th of June.

In this case there were 8 boilers placed side by side, and it was the 3d boiler from the eastern side of the range that exploded ; No. 5 and No. 8 boilers were not being worked at the time, but the other 6 boilers were being used.

The evidence at the inquest led to the following conclusions : the boilers numbered 1, 2, 3, and 4 had their fires damped up during all the day of the explosion, had each been properly charged with water during the forenoon, and were examined and found to be all right at 5 o'clock in the afternoon, at which time the feed water was going into No. 7 boiler alone.

The steam valves of Nos. 1, 2, 3, and 4 boilers were closed at that time ; the feed is supplied by a donkey engine from a pond in which there was plenty of water.

No leakage had been observed in the boiler that exploded, which had been cleaned about 8 days previous to the occurrence. The closing of the steam valves puts the boilers out of communication with the steam gauge so long as they remain in that state. There was no alarm whistle for indicating a want of water. The boilers were sludged twice a day. A considerable amount of fur was deposited by the feed water. The damper was down at 5 P.M., when John Morgan, who was one of the enginemen, left the engine.

The boilers were fired by means of Jukes' apparatus. There was an outside kep clack in connexion with the feed to prevent the backing of the water. Where Jukes' apparatus is employed a leakage cannot be seen, but may be detected by hearing the evaporation of the water.

On the 8th of May, about a month previous to the accident, about 20 rivets had been renewed in the boiler, and a length of about 8 feet of seam had then been caulked on the underside of the fire end of the boiler, and on the 29th May, when these repairs were finished, the foreman stated that he examined the boiler and observed no danger.

A model of the boiler, showing the positions of the seams and of the safety and working apparatus and those of the lines of fracture caused by the explosion, was produced at the inquest by Mr. Benjamin Dawson, the colliery engineer, together with samples of plates which had been torn by the explosion.

He stated that the boiler was built by Messrs. Hawkes and Co., and was about 27 years old, but that it had only been in actual use about 14 years, having been at Murton and at Wingate Collieries before being used at Kelloe Winning. There was no considerable thinning of the plates that had been torn by the explosion. The boiler was 30 feet in length, and 6 feet in diameter, and had upon it two safety valves, each 4 inches in diameter, and two common wheel floats, but no water-alarm whistle.

The steam gauge was not in connexion with No. 3 boiler at the time of the explosion. The steam, feed, and sludge valves were found closed after the explosion. There was no sign of want of water or of overheating on the plates of the boiler.

The water used is the limestone feeder, and forms a considerable amount of scale or fur on the boiler plates ; sometimes it is $\frac{3}{16}$ths of an inch thick ; the boilers were cleaned about once a fortnight or once in three weeks.

The boiler was tested by hydraulic pressure up to 70 lbs. per square inch about two years previous to the explosion.

The safety valve weights required to be at the ends of the levers to give the working pressure of 35 lbs. to the square inch.

The boilers were under the inspection of a Boiler Insurance Company, and had been last inspected by a person on behalf of the Insurance Company on the 26th May, when No. 3 boiler was at work ; a few small leakages were then observed in it over the fire, and the caulking was afterwards done in consequence.

In this instance, I am of opinion that the boiler had a proper supply of water in it, that the safety attachments were in proper working order, and that the explosion took place either at the ordinary working pressure or at the usual very slight extra pressure arising from the resistance of the safety valves to the steam in blowing off.

I think that the tearing of the boiler had originated at an old crack, about 15 inches in length, which appeared to have extended in a longitudinal direction along the boiler, but had not been detected until after the explosion occurred. After the boiler had exploded, and until this old crack was discovered, I had thought that there must have been some unusual amount of pressure to cause the boiler to explode, but when it was found I changed my opinion as to the cause. When once a considerable rent is made in a boiler the pressure acting upon the plates adjacent to the line of separation is generally

sufficient to tear the boiler to pieces, even through the strongest parts of the solid plates of which it may be composed.

It may be observed that I attribute these two boiler explosions to precisely similar causes, that of an old crack in the plates which had escaped detection ; but it is evident that in old boilers which have long been in use, and have had the plates partially crystallized and deteriorated, and have frequently been repaired, and strained more or less by pinning the rivet holes so as to bring them together, such cracks are more likely to exist than in newer boilers that have been less subject to such strains.

And hence upon the whole I should consider that an increased amount of freedom from these unpleasant occurrences would result from limiting the age and the time during which boilers should be allowed to be used, together with enforcing the testing of boilers by hydraulic or pneumatic pressure up to about twice the pressure at which they should be allowed to be worked at moderate intervals of time.

No. 46 accident in the list arose through an engineman improperly asking a youth of only 12 years of age to put a driving belt to the centre of a sheave, when he ought to have done it himself, as he was at the time in charge of the engine and of the machinery.

The youth, in attempting to put the driving belt into its proper place, became entangled with the adjoining spur wheels, and received such injuries as caused his death ; and the engineman in attempting to rescue him fell, and came in contact with the arms of the fly-wheel, and also received injuries which almost immediately caused his death. The engine had only been at work a few days at the time, and was used for the purpose of working a small coal apparatus. Although the youth had nothing to do in the engine house (he being employed to grease sheaves upon the railway), yet the engineman ought neither to have allowed him to be there, nor to have asked him to place the driving belt in its proper position upon the sheave.

Reported non-fatal Accidents.

A number of non-fatal accidents, causing more or less personal injury, have been reported as occurring during the past year ; but it would appear to be altogether useless to attempt to classify or marshal the figures or statistics, as there is such a very wide discrepancy between the degrees of injury that have been caused by them ; and I have good reason to think that whilst accidents of this nature, causing very slight and temporary personal injuries, are reported from some collieries, others causing permanent personal injuries are not reported from other collieries.

I may however select a few for remarking upon.

One of the non-fatal accidents was an explosion of a small quantity of fire-damp at Thornley Colliery, in which I consider that there was a want of proper precaution both on the part of the overman and on that of one of his deputies.

The overman had cautioned the sufferer to use a safety lamp when holing his board into a wall lest there should be fire-damp in it, there being a small dislocation of the strata in the wall. On effecting a holing into the wall the hewer called the deputy overman, who, on opening the place, gave him leave to work with a naked light, and to blast ; but a slight explosion of gas arose from his blasting by which he was scorched.

The hewer ought not to have been allowed any discretion in the matter, but should have had a safety lamp given to him and been prohibited from using a naked light as well as from blasting under such circumstances.

The overman's cautions were short of what they ought to have been, and the deputy and hewer were both to blame for not obeying them ; besides which there is reason to fear that the deputy had not made a sufficiently careful examination of the state of the atmosphere in the wall before giving the hewer leave to use a naked light and to blast the coal with powder.

A shifter was also burnt by an explosion of fire-damp at Thornley Colliery during the course of the year, to wit, on the 24th May.

At Wingate Grange Colliery a putter was scorched by an explosion of fire-damp, in April, through his having gone past a danger signal with a naked light, contrary to the rules of the colliery.

Another case of scorching by the explosion of a small quantity of fire-damp occurred at Trimdon Colliery, on the 10th of November, scorching a pony putter who improperly went into a place which was not at work with an open light, by which the fire-damp was ignited.

Complaints from Workmen.

During the past year I may mention that I have had two complaints from workmen, one from Brasside Colliery, belonging to the Earl of Durham, as to defective ventilation, and on making an inspection of the mine I found the complaint was not made without reason; the viewer agreed to suspend the working of the pit until a proper furnace, then in the course of erection, was completed.

The other complaint was from a workman at Shincliffe Colliery belonging to Messrs. Love and Spark, and also related to ventilation; in this case, too, I found some cause for the complaint, and obtained a satisfactory promise that immediate steps should be taken to remedy the evil.

Underground Employment and Education of Boys.

The instances of boys being employed in the mines of the district under the age at which educational attainments are required by the Mines Inspection Act are so very rare that I seldom come into contact with them, unless in rare instances of mere suspicion that the parents of a boy may have overstated his age for the purpose of getting him so employed. There are I believe a very few exceptional cases where certificates as to the boy being able to read and write are obtained from a schoolmaster when the boy is professedly under twelve years of age, but even in these cases I believe that they are also required, for the most part, to attend school for the hours that are only required by the Act in the event of their not being certified as being able to read and write.

The very few instances in which boys under 12 years of age are employed underground are, I have reason to suppose, mostly in cases where the mother is a widow, or the family large or in bad circumstances.

There are 171 collieries in this District.

I have, &c.
JOHN J. ATKINSON,
Inspector of Mines.

The Right Hon. H. A. Bruce, M. P.,
H. M. Principal Secretary of State
for the Home Department.

LIST of the FATAL COLLIERY ACCIDENTS, and LOSS of LIFE arising therefrom, in the SOUTH DURHAM MINES INSPECTION DISTRICT, during the Year ended 31st day of December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Jan. 3	1	North Hetton	Moorsley	North Hetton Coal Co.	James Swift	Wagon rider	22	Crushed by wagons at screens	–	–	–	–	1	1
„ 3	2	Water Houses	Crook	Jos. Pease & Partners	Thos. Morton	Shifter	62	Fall of stone while setting heavy timber.	–	1	–	–	–	1
„ 8	3	Brooms Drift	Consett	Consett Iron Co.	Fenwick Scott	Rolleyway-man.	50	Crushed by the 1st of a pony set of two full tubs against lying timber: switches wrong.	–	–	–	1	–	1
„ 15	4	Keepier	Durham	John Thwaites	Wm. Scarth	Putter	16	Fall of stone; a putter who had exchanged work with the hewer.	–	1	–	–	–	1
„ 17	5	Shincliffe	Ditto	Love & Spark	H. Williamson	Hewer	17	Fall of stone in a wide board	–	1	–	–	–	1
„ 17	6	Oakenshaw	Willington	Strakers & Love	John Lydon	Ditto	25	Crushed in shaft while ascending; he had apparently put his head out of cage.	–	–	1	–	–	1
„ 21	7	St. Helen's (engine pit).	Bishop Auckland	Jos. Pease and Partners	Chas. Houlder	Ditto	22	Fall of stone	–	1	–	–	–	1
„ 22	8	Haswell	Fence Houses	Haswell, &c. Coal Co.	John Macgreavy	Driver	13	Crushed by tub of plates which was upset upon him by horse taking fright.	–	–	–	1	–	1
„ 23	9	Rainton (Nicholson's pit).	Leamside	Earl Vane	James Kennedy	Pony-putter	18	Head crushed by tub drawn by pony	–	–	–	1	–	1
„ 24	10	Seaham (No. 2 pit).	Seaham Harbour	Ditto	Robert Gray	Hewer	18	Fall of stone	–	1	–	–	–	1
„ 27	11	Burnhope	Lanchester	Messrs. Sowerby & Fletcher	John Rowell	Deputy	34	Ditto	–	1	–	–	–	1
„ 31	12	Sherburn House	Durham	Earl of Durham	Wales Mason	Hewer	29	Ditto	–	1	–	–	–	1
Feb. 5	13	South Durham	Bishop Auckland	Owners of South Durham Colliery.	A. Hargreaves	Hooker-on	47	Rapped incline set away without putting chain on: crushed by tubs.	–	–	–	1	–	1
„ 6	14	Seaton	Seaham Harbour	Earl Vane	Wm. McGrath	Pony-putter	13	Crushed by falling over round coal heap with a tub, which fell upon him.	–	–	–	–	1	1
„ 12	15	Coxhoe	Ferry Hill	J. Morrison & Partners	John Lee	Screenman	32	Crushed by trucks near screens	–	–	–	–	1	1
„ 14	16	Trimdon	Ditto	Thomas Wood	Patrick Graham	Hewer	34	Crushed between tub and roof, got on while in motion.	–	–	–	1	–	1
„ 15	17	West Thornley	Tow Law	Weardale Iron & Coal Co.	John Kelly	Helper-up	12	Crushed between tub and roof; he had only worked 2 days.	–	–	–	1	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Feb. 15	18	North Hetton (Moorsley).	Fence Houses -	North Hetton Coal Co. -	Thos. Lisle -	Coal filler -	23	Crushed by a wagon on branches, through falling down in front of it.	–	–	–	–	1	1
„ 17	19	South Pelaw -	Chester-le-Street	E. M. Perkins & Partners	Henry Bulmer -	Hewer -	22	Fall of stone; the overman and deputy had shortly before examined the stone.	–	1	–	–	–	1
„ 21	20	North Bitchburn	Darlington -	North Bitchburn Coal Co.	Jos. Nicholson -	Ditto -	48	Fall of stone - - - -	–	1	–	–	–	1
„ 25	21	Haswell -	Fence Houses -	Haswell, &c. Coal Co. -	Willm. Dandy -	Pony driver	13	Crushed by tubs - - -	–	–	–	1	–	1
„ 26	22	Wingate Grange	Ferry Hill -	Executors of late J. Gully	Willm. Dowling -	Screenman -	—	Crushed between two wagons -	–	–	–	–	1	1
Mar. 13	23	Castle Eden -	Ditto -	Wm. Cook - -	Matthew Lee -	Hewer -	18	Fall of stone - - - -	–	1	–	–	–	1
„ 14	24	West Auckland	Darlington -	Bolckow, Vaughan, & Co.	Francis Clark -	Ditto -	24	Fell down ladder pit shaft - -	–	–	1	–	–	1
„ 19	25	Thornley -	Ferry Hill -	Thornley, &c. Coal Co. -	Willm. Daley -	Ditto -	22	Crushed by fall of stone in a broken jud.	–	1	–	–	–	1
„ 26	26	Wingate Grange	Ditto -	Executors of late J. Gully	John Cook -	Shifter -	—	Was taking a tub along engine bank and was caught by engine train.	–	–	–	1	–	1
„ 30	27	Middle Pit (Murton).	Fence Houses -	South Hetton Coal Co. -	James McDougle -	Pony-putter	13	Crushed by pony tub - -	–	–	–	1	–	1
April 3	28	Norwood -	Bishop Auckland	The Owners of Norwood Colliery.	Ralph Hall -	Sheave greaser	13	Crushed by tub - - -	–	–	–	1	–	1
„ 4	29	South Pelaw -	Fence Houses -	Hunt, Perkins, & Co. -	Mark Leathard -	Brakesman -	45	Death caused by boiler explosion -	–	–	–	–	1	1
„ 6	30	North Hetton -	Ditto -	North Hetton Coal Co. -	Wm. Mitchell -	Pony-putter	14	Crushed between tubs and roof -	–	–	–	1	–	1
„ 8	31	Pittington -	Ditto -	Ditto - - -	Rodham Hall -	Ditto -	14	Crushed between prop and tubs -	–	–	–	1	–	1
„ 8	32	Wooley -	Darlington -	Jos. Pease & Partners -	Adam Haslam -	Hand-putter	18	Fall of stone - - - - -	–	1	–	–	–	1
„ 9	33	Coxhoe -	Coxhoe -	West Hetton Coal Co. -	John Smith -	Hewer -	25	Crushed by fireclay falling on him -	–	1	–	–	–	1
„ 9	34	Inkerman -	Durham - -	Messrs. Ferens & Love -	John Bell -	Horse driver	39	Crushed between wagons at bank -	–	–	–	–	1	1
„ 11	35	Low Bitchburn	Crook - -	John Sharp - -	John Rennison -	Hewer -	22	He undermined a prop, and so caused a fall of stone, which caused his death.	–	1	–	–	–	1
„ 23	36	Ryhope - -	Sunderland -	Ryhope Coal Co. -	Thos. Harker -	Ditto -	40	Fall of stone in broken jud -	–	1	–	–	–	1
„ 28	37	Haswell - -	Fence Houses -	Haswell, &c. Coal Co. -	George Jackson -	Deputy -	35	Crushed by stone while drawing timber.	–	1	–	–	–	1
„ 29	38	Hunwick -	Durham - -	J. Lancaster & Co. -	Martin Nolan -	Screenman	55	Crushed between wagons - -	–	–	–	–	1	1
„ 30	39	Middle Bitchburn.	Crook - -	Thos. Liddel, Agent -	Richard Harrison -	Horse keeper	65	Crushed by tubs in the engine plane	–	–	–	1	–	1
May 14	40	Brancepeth -	Durham -	Messrs. Strakers & Love -	Joseph Bowden -	Deputy -	28	Fall of stone - - - -	–	1	–	–	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
May 14	41	Wingate Grange	Ferry Hill	Executors of late J. Gully	John Emmerson	Hewer	29	Fell out of an iron tub to a distance of 20 fathoms.	–	–	1	–	–	1
„ 18	42	Old Etherley	Auckland	Henry Sobart & Co.	John Crossfield	Rolley driver	14	A set of tubs struck him on the chest.	–	–	–	1	–	1
„ 21	43	Thrislington	Coxhoe	James Morrison & Co.	Wm. Shaw	Hewer	38	Fell into the sump and was drowned	–	–	1	–	–	1
June 8	44	Houghall	Durham	Messrs. Love and Spark	John Higgins	Pony putter	16	Fall of stone, in broken	–	1	–	–	–	1
„ „	45	Kelloe	Coxhoe	East Hetton Coal Co.	John Smith	Fireman	—	Boiler explosion	–	–	–	–	1	2
„ „	„	Ditto	Ditto	Ditto	Thos. Scarr	Ditto	—	Ditto	–	–	–	–	1	
„ 9	46	Framwellgate	Durham	Earl Vane	Septimus Turnbull	Engineman	20	Crushed by machinery	–	–	–	–	1	2
„ „	„	Ditto	Ditto	Ditto	Jonathan Briggs	Sheavegreaser	12	Ditto	–	–	–	–	1	
July 1	47	South Kelloe	Coxhoe	West Hetton Coal Co.	Chas. Barrowclough	Hewer	67	Fall of coal	–	1	–	–	–	1
„ 2	48	Penshaw	Penshaw	George Elliot	Owen Kirk	Onsetter	—	Killed in a drop staple by cage	–	–	1	–	–	1
„ 7	49	Newfield	Willington	Hunwick Coal Co.	Thos. Tones	Fireman	17	Crushed by cage when calling down shaft.	–	–	1	–	–	1
„ 9	50	West Pelton	Chester-le-Street	Jas. Joicey & Co.	John Hunter	Wailer	13	Injured on head by a stone thrown off screens.	–	–	–	–	1	1
Aug. 1	51	Butterknowle	Staindrop	Trustees of late L. Pratman	Wm. Shaw	Hewer	24	Fall of stone	–	1	–	–	–	1
„ 7	52	Thrislington	Ferry Hill	West Hetton Coal Co.	Joseph Palmer	Onsetter	23	Explosion at the shaft	1	–	–	–	–	1
„ 8	53	Brancepeth	Willington	Messrs. Strakers and Love	Abraham Hodgson	Hewer	26	Fall of stone in pillar working	–	1	–	–	–	2
„ „	„	Ditto	Ditto	Ditto	Michael Clark	Ditto	36	Fall of stone in broken	–	1	–	–	–	
„ 12	54	Bowburn	Coxhoe	West Hetton Coal Co.	Wm. Waggot	Onsetter	—	Crushed by tubs near shaft	–	–	–	1	–	1
„ 21	55	Castle Eden	Castle Eden	Willm. Cook	Edward Horton	Hewer	21	Fall of stone	–	1	–	–	–	1
„ 27	56	Black Boy	Bishop Auckland	Black Boy Coal Co.	Thos. Robinson	Horsekeeper	44	Run over by empty set on engine plane.	–	–	–	1	–	1
„ 31	57	Adelaide	Ditto	Josh. Pease & Partners	Thos. Allen	Driver	14	Crushed by tubs	–	–	–	1	–	1
Sept. 5	58	Murton	Fence Houses	South Hetton Coal Co.	Thos. Best	Hewer	36	Fall of stone	–	1	–	–	–	1
„ 8	59	Rainton	Leamside	Earl Vane	Robert McChessney	Trapper	10½	Crushed by a coal tub	–	–	–	1	–	1
„ 9	60	Eppleton	Fence Houses	Hetton Coal Co.	Walter Borthwick	Hewer	19	Fall of stone	–	1	–	–	–	1
„ 11	61	Thornley	Ferry Hill	Hartlepool Collieries Co.	Allen Glen	Ditto	32	Ditto	–	1	–	–	–	1
„ 16	62	Pelton	Chester-le-Street	W. J. Hutchinson & Partners.	Matthew Herring	Putter	44	Ditto	–	1	–	–	–	1
„ 17	63	Wingate Grange	Ferry Hill	Executors of late J. Gully	James Maddison	Shaftman	32	Fell from Low Main seam into sump	–	–	1	–	–	1
„ 21	64	Pelton	Chester-le-Street	W. J. Hutchinson & Partners.	George Punshon	Driver	15	His feet slipped at bottom of shaft, and he fell into the cage hole and was crushed by the cage.	–	–	1	–	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Sept. 24	65	Bowden Close	Willington	Joseph Pease & Partners	Michael Straker	Hewer	35	Fall of stone	–	1	–	–	–	1
„ 28	66	Eppleton	Fence Houses	Hetton Coal Co.	Wm. Soulsby	Stoneman	46	Ditto	–	1	–	–	–	1
Oct. 2	67	Willington	Willington	Messrs. Strakers & Love	James Southern	Landing-boy	13	He received a blow on the head from the handle of a winch while changing ropes.	–	–	–	1	–	1
„ 7	68	Old Durham	Durham	Earl Vane	John Defty	Pony driver	13	Crushed by empty tubs on engine plane.	–	–	–	1	–	1
„ 23	69	Seaham	Sunderland	Ditto	John Pearce	Hewer	20	Fall of stone	–	1	–	–	–	1
„ 26	70	Greenhead	Durham	Snowdon, Kellett, & Co.	Thos. Hunter	Putter	15	Crushed by tub	–	–	–	1	–	1
„ 27	71	Thornley	Hartlepool	Hartlepool Collieries Co.	Peter Downison	Driver	15	By machinery	–	–	–	1	–	1
Nov. 2	72	Keepier	Durham	John Thwaites	Wm. Dixon Parkin	Hewer	53	Fall of stone	–	1	–	–	–	1
„ 6	73	Eppleton	Fence Houses	Hetton Coal Co.	Joseph Spooner	Deputy	41	Ditto	–	1	–	–	–	1
„ 10	74	Lady Durham	Durham	Earl of Durham	Willm. Lynn	Ditto	60	Fell down shaft from hole at branches.	–	–	1	–	–	1
„ 20	75	Framwellgate	Ditto	Earl Vane	Thos. Knox	Hewer	60	Crushed by tubs	–	–	–	1	–	1
„ 21	76	Woodhouse Close	Bishop Auckland	Sir C. F. McLean, Bart.	Mark Hall	Brakesman	56	Got entangled in underground engine	–	–	–	1	–	1
„ 27	77	Haswell	Fence Houses	Haswell, &c. Coal Co.	Lancelot Johnson	Hewer	34	Fall of stone	–	1	–	–	–	1
„ 29	78	Ryhope	Sunderland	Ryhope Coal Co.	Robt. Donkin	Wagonway-man.	21	Crushed by tubs	–	–	–	1	–	1
Dec. 3	79	Castle Eden	Ferry Hill	Wm. Cook	Wm. Dower	Sinker	28	A piece of plank fell down the shaft upon him.	–	–	1	–	–	1
„ 10	80	Elm Park	Crook	Bainbridge & Kirsopp	John Willis	Hewer	17	Fall of stone	–	1	–	–	–	1
„ 12	81	Iveston	Medomsley	Consett Coal Co.	Wm. Lupton	Ditto	36	Fall of coal	–	1	–	–	–	1
„ 16	82	Seaham	Sunderland	Earl Vane	Willm. Ford	Heap keeper	62	Killed at apparatus	–	–	–	–	1	1
„ 19	83	Haswell	Fence Houses	Haswell, &c. Coal Co.	Wm. Wild	Deputy	50	Fall of stone	–	1	–	–	–	1
„ 21	84	Page Bank	Willington	Bell Brothers	John Greenwell	Screener	11	Crushed between wagons at bank	–	–	–	–	1	1
								Total	1	36	10	25	15	87

Mr. Dickinson's Report.

Report on the Inspection of Mines in the North and East Lancashire or Manchester District for the Year ended 31st December 1868.—By Joseph Dickinson, Esq., F.G.S.

Sir, Pendleton, Manchester, 27th February 1869.

In accordance with the Act 23 & 24 Vict., c. 151, I have the honour to report to you that the Acts for the regulation and inspection of coal mines appear to be working satisfactorily in this district; and that the number of fatal accidents and deaths, and the proportion of them to the number of persons employed, and to the quantity of coal wrought, is low, as compared with prevous years. Working the regul tions.

The number of separate fatal accidents in the year 1868 amounts to 61, and the deaths therefrom to 65. The average for the ten years ending 1861, when much fewer persons were employed, was 63·3 fatal accidents, and the deaths 90 per annum; so that, independently of the increase in the number of persons employed and the quantity of coal wrought, there is simultaneously a decrease of fatalities. The acci dents.

Year.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	10 Years Average.	1862.	1863.	1864.	1865.	1866.	1867.	1868.
Separate Accidents.	60	60	73	78	73	52	60	55	55	67	63·3	56	60	60	61	55		
												Transferred portion				3		
																58	71	61
Deaths -	113	82	87	89	84	99	138	68	58	82	90·0	59	68	64	66	66		
												Transferred portion				3		
																69	84	65

As to the proportion of accidents and deaths to the number of persons employed and to the quantity of coal wrought, I have, as in previous years, made application to each owner, and in reply the number of persons employed and the quantity of coal wrought has been furnished to me from all except three collieries; I am, therefore, enabled to state the proportions with the nearest possible approach to accuracy. The three collieries from which I have not received returns on this occasion are the Bentgrange, Dootson-vauze, and Seedfield, the numbers for which I have computed at 89 persons and 26,932 tons. With this small exception the results arrived at are from actual returns. They show that in the year 1868 the total number of persons employed in and about the collieries averaged 26,360, and that 7,053,000 tons of coal were wrought. By dividing the number of fatalities into these numbers it will be found that there has been 1 separate fatal accident to every 432 persons employed, and to every 115,623 tons of coal wrought; and 1 death to every 405 persons employed, and to every 108,508 tons of coal wrought. These proportions are, in round numbers, about twice as favourable as they were at the commencement of the inspection of coal mines, nearly 20 years ago. Proport of accid to persc employe and coal wrough

The fatal accidents in 1868 consisted of— Kind of accident

4	by explosions of fire-damp - -	causing 5 deaths	
33	„ roof and coal falling - - -	„ 33	„
6	„ shaft accidents - - - -	„ 8	„
15	„ miscellaneous accidents below ground -	„ 16	„
3	„ ditto ditto on the surface -	„ 3	„
61		65	

The circumstances under which each of the fatal accidents happened are described in the accompanying detailed lists.

on-fatal cidents.

The reports of personal but not fatal injuries by explosions show that, in addition to the fatal accidents, personal injuries were received in 27 instances by firedamp, in 10 by blasting powder, and in 1 instance by the explosion of a steam boiler. The other non-fatal accidents having only to be reported when the injury is considered serious, allows so much latitude in determining what is *serious* that the numbers are not sufficiently reliable to be worth recording. It may be specified, however, that as many as 27 instances have been reported of injuries by waggons below ground.

awbacks.

In the list of fatal accidents there is one to a person whilst getting the cage out of the shaft, where it had been fixed by the safety apparatus when the rope broke; and in the reports of non-fatal accidents there is also an instance of a person at the bottom of a shaft being struck by a falling stone that glanced off the pointed cover to the cage. The safety apparatus affords security in so many instances that a drawback of this kind is but little against it; but it is not so clear whether a pointed instead of a flat cover does not introduce as much danger as it averts.

ecautions.

In each instance of neglect or accident, which has appeared to require it, I have endeavoured to get the regulations complied with in future. And as the best means of making well known the precautions which appear to be generally requisite at present, I have sent to each colliery a circular letter, pointing out, that,—

1st. The miners require to be frequently cautioned to set sprags and props, as large blocks of stone and coal, which sound solid, fall without warning.

2nd. Trams or waggons should be more carefully secured from getting loose on slopes or inclines. And, before waggoners are allowed to take waggons down a slope, it should be ascertained that they can stop the waggon if required, so as to avoid overtaking and running over their fellow waggoners who are in advance, and to give persons on the road time to get out of the way, and, where there is only one line of rails, to avoid coming into dangerous collision with any one pushing a waggon up the slope.

3rd. In blasting, an iron, instead of a wooden or a copper rammer, is still too often used in getting the wadding and first part of the stemming fairly bedded on to the powder; and shots which have missed fire are still drawn, although experience shows that even with water in the hole the drill goes in advance and fires the powder. The best way being to put a small shot near enough to fire both charges. The practice of taking barrels and large quantities of powder down the pit should be discontinued.

4th. As to ventilation, a recent decision of the judges shows that parts of the mine which are not being worked but to which a person could find access, or from whence gas might issue, so as dangerously to affect any working place or travelling road, have to be kept ventilated as well as the working places and travelling roads. The appointed station for work persons to stop at should therefore be carefully defined and adhered to.

And I give notice, that I require covers to be provided and used overhead when lowering or raising persons in all working pits or shafts except in those worked by a gin or a windlass, or whilst sinking or pump work is being done, or, in special cases, where written exemption is obtained from me annually.

nalties.

The neglect which has come under my notice at two of the collieries during the year has appeared beyond what I should adjudicate upon, and I, therefore, caused proceedings to be taken for the penalties. In one of these, the owner of the Rose-hill colliery was fined 10*l.* for not providing adequate ventilation against firedamp, and 5*l.* for not providing a place of refuge on a self-acting inclined plane. In the other, the owner of the Farnworth colliery (which is now closed) was fined 5*l.* for not providing adequate ventilation against blackdamp, the candles where the men were at work going out when placed upright. These sums have been paid to the respective clerks to the justices, to be paid over to the receiver of government fines, as the Act directs. In an adjoining district, during the illness of one of my colleagues, I had also to cause proceedings to be taken against the owner of the Afon-eitha colliery for neglecting to provide a second outlet to the colliery. This penalty, a sum of 10*l.*, was divided between a miner and a boy who were marvellously rescued after being shut up in the pit for eight days, by the sides of the shaft falling in.

LIST of the FATAL COLLIERY ACCIDENTS, and LOSS OF LIFE arising therefrom, in the NORTH and EAST LANCASHIRE or MANCHESTER DISTRICT, under Mr. DICKINSON'S Inspection, during the Year 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868. Jan. 13	1	Moston -	Manchester - -	Executors of John Stanley	Joseph Thompson	Assistant hooker-on.	15	Crushed by the cage, which was started unexpectedly. The engineman stated that the signal was given to go on, but the head hooker-on denied it.	–	–	1	–	–
„ 20	2	Bankhouse -	Shaw - -	Oldham, Middleton, and Rochdale Co. (Limited.)	Thomas Owen -	Waggoner -	10	Caught by a waggon from which the skotch had got out of the wheel. It ran against the waggon which he and another boy were pushing up an ascending road.	–	–	–	1	–
„ 22	3	Dootson Vauze	Blackrod - - -	Samuel Leather - -	Anthony Milner -	Miner -	42	Roof falling upon him in the drawing road, as he was passing with a waggon.	–	1	–	–	–
Feb. 4	4	Agecroft -	Pendlebury - -	Andrew Knowles and Sons	John Greenhalgh -	Boy - -	—	Run over by a waggon which he and other boys were taking down a brow.	–	–	–	1	–
„ 25	5	Hudclough -	Facit - - -	Smithson and Butterworth	James Bridge -	Miner -	32	Roofstone, which broke off at a seam, falling upon him.	–	1	–	–	–
„ 28	6	Bank Top -	Radcliffe - -	Knowles and Hall - -	John Birch -	Ditto -	45	Roofstone falling at a slip. It fell over a prop.	–	1	–	–	–
Mar. 6	7	Bank - -	Little Hulton -	John Wright - -	Giles Eckersley -	Waggoner -	16	Roof falling at a slip, in the face of a bay in the Cannel mine.	–	1	–	–	–
„ 17	8	Clifton Hall -	Clifton - -	Andrew Knowles and Sons	James Potter -	Miner -	—	Roof coal in the Trencherbone mine falling after a chock was taken out. He died in the Salford Dispensary.	–	1	–	–	–
„ 19	9	Glodwick -	Oldham - - -	James Collinge and Co. -	Thomas Mills -	Ditto -	30	Burned by firedamp which he fired on going into an old working. He had been in the same place a few hours before and fonnd no gas, but he ought not to have returned without taking a safety lamp to ascertain that the ventilation was being maintained. Died 8th April.	1	–	–	–	–

List of Fatal Colliery Accidents.—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.													
Mar. 27	10	Heyfield -	Westleigh - -	James Diggle - -	Richard Nalty -	Miner -	27	Coal in the 6-feet mine falling upon him.	–	1	–	–	–
„ 30	11	Pendlebury -	Pendlebury - -	Andrew Knowles and Sons	Thomas Sweeney -	Ditto -	36	Struck by a crane handle whilst letting a full waggon down a steep bay in the Crumbouke mine.	–	–	–	1	–
April 6	12	Bower - -	Hollinwood -	Messrs. Marland -	John Whitaker -	Ditto -	32	A stone falling upon him from the roof. He had failed to get it down with wedges and a crow-bar; but it fell without warning as he was underneath, stemming a shot to blow it down. It should have been propped before he went underneath.	–	1	–	–	–
„ 8	13	How Bridge -	Atherton - -	John Fletcher and others	Charles Rothwell -	Ditto -	24	Coal which he was taking down in the great 7-feet mine falling upon him. It did not fall as he expected, and he incautiously, without re-setting the sprags, went underneath to undermine it a little more.	–	1	–	–	–
„ 9	14	Bradford -	Manchester - -	Bradford Co. - -	James Stafford -	Boy - -	14	Roof falling at a slip in the waggon road.	–	1	–	–	–
„ 16	15	Manor - -	Kearsley - -	Clifton and Kearsley Co.	Thomas Basil -	Waggoner -	13	Coal falling in the Doe mine -	–	1	–	–	–
„ 21	16	Chadwick Hall	Rochdale - -	Roscow and Lord - -	- - -	Miner -	—	Roof falling. He died 5th Sept. -	–	1	–	–	–
„ 22	17	Lower Moor -	Oldham - -	Mayall and Seddon -	William Lowe -	Ditto -	40	Coal falling upon him, and further injuries afterwards by the rope breaking at the socket, as he was being sent up the engine brow. Died 24th.	–	1	–	–	–
„ 29	18	Altham -	Accrington - -	W. E. Taylor (Altham Co.)	James Cronshaw -	Ditto -	39	Roof falling in some old workings near the outcrop in a clough.	–	1	–	–	–
May 1	19	Kearsley -	Kearsley - - -	Samuel Scowcroft - -	William Dearden -	Ditto -	46	Coal falling off to a back as he was beginning a new place at the side of a level.	–	1	–	–	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868. May 6	20	Dearnley -	Smallbridge - -	Schofield and Co. -	Charles Whipp Samuel Cheetham	Waggoner - Miner -	15 39	Explosion of firedamp. Whipp died on the 14th, and Cheetham on the 16th. The fireman, although he had discovered that adequate ventilation was not being maintained up to the face, allowed them to go in to disperse the gas, when, being inexperienced, they took a candle too near, and lighted the gas. The underlooker and the fireman were censured by the coroner's jury, and the owners requested to see that the rules were adhered to in future.	2	–	–	–	–
„ 8	21	Holebottom -	Oldham - -	Leeses, Jones, and Co. -	Hugh Nield -	- - -	—	Caught by a waggon which ran violently down a short self-acting brow; he having omitted to hook his empty waggon at the bottom.	–	–	–	1	–
„ 23	22	Pendlebury -	Pendlebury - -	Andrew Knowles and Sons	William Wallwork	Bricklayer's labourer.	—	Killed by getting his arm drawn over a pulley as he was attempting to attach a balance weight without the engine being stopped.	–	–	–	–	1
„ 29	23	Chadwick Hall	Rochdale - -	Roscow and Lord -	Edward Chadwick Edward Hartley -	Miner - Ditto -	18 22	Burned by an explosion of powder. They were charging a hole with an iron scraper, when the powder went off, about 8 pounds besides being fired; but it could not be ascertained whether the scraper struck fire at a piece of rock, or whether one of the deceased put his candle to the hole.	–	–	–	2	–
„ 29	24	Martholm -	Great Harwood -	Richard Fort, M.P. -	John Aldred -	Ditto -	—	Coal falling from the side of a level as he was doing some repairs. It fell from the break which usually takes place at the side of a level; and he should have set sprags.	–	1	–	–	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868. May 30	25	Manor - -	Kearsley - -	Clifton and Kearsley Co. -	Benjamin Thomas	Driver -	14	Run over by waggons on the colliery railway, his foot having caught the switch as he was unhooking the horse. Died in the infirmary.	–	–	–	–	1
June 11	26	Pendleton -	Pendleton - -	Andrew Knowles and Sons	Jeremiah Buckley	Miner -	—	Roof falling in the Rams mine. Died in the infirmary.	–	1	–	–	–
„ 13	27	Westleigh -	Westleigh - -	Wigan Coal and Iron Co. (Limited).	James Smith -	Waggoner -	16	Caught between two tubs in the balance brow, a tub at the top of the brow having been hooked by mistake to a piece of loose chain instead of to the balance chain.	–	–	–	1	–
„ 17	28	Broadfield -	Westleigh - -	John Speakman - -	William Isherwood	Miner -	45	Coal falling upon him when at his work.	–	1	–	–	–
„ 20	29	Denton Lane -	Chadderton - -	Chamber Co. - -	Thomas Eckersley	Ditto -	20	Stone falling upon him at a fault -	–	1	–	–	–
„ 24	30	Maugnalls -	Worsley - -	Bridgewater Trust -	William Clare -	Waggoner -	19	Roof coal falling in the 7-feet mine	–	1	–	–	–
„ „	31	Welch Whittle	Welch Whittle -	James Darlington -	John Baxendale -	Ditto -	—	Explosion of firedamp. Died 4th July. He omitted to try his place with a safety lamp on returning, to see if adequate ventilation had been maintained whilst he was out with a waggon.	1	–	–	–	–
„ 26	32	Bardsley -	Ashton-under-Lyne -	Bardsley Co. - -	Jos. Appleton -	Ditto -	18	Shale from the roof breaking the timbering, about ten yards from the face of the work, as he and the collier were underneath with a waggon.	–	1	–	–	–
„ 27	33	Stopes -	Little Lever -	Thomas Fletcher -	John Berry -	Miner -	31	Coal falling from the roof in the 10-feet mine. Died 23d July.	–	1	–	–	–
July 1	34	No. 11 Yard -	Hulton - -	Hulton Co. - -	Ralph Halliwell -	Ditto -	—	Roof falling, when he returned after firing a shot. Died 15th Sept.	–	1	–	–	–
„ 2	35	Cat Hole -	Baxenden - -	Hargreaves, Ashworth, and Co.	Peter Parker -	Metal-man	25	A shot going off as it was being rammed. An iron, instead of a wooden or copper rammer being used in getting the first part of the ramming bedded on to the wadding over the powder.	–	–	–	1	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868. July 2	36	Raikes	Great Lever	Earl of Bradford	Jeremiah Greenhalgh.	Boy	13	Hurt at a shunt by a train of waggons on the engine plane, the signal to go on having been given too soon by some one. Died 13th Sept.	–	–	–	1	–
„ 27	37	Haughton Green	Haughton	Thomas Shaw and Sons	John Stansfield	Deputy fireman.	—	Run over by a waggon which a boy 14 years old let go on the jig brow in the Peacock mine. Died in the Manchester infirmary.	–	–	–	1	–
Aug. 4	38	Broadfield	Westleigh	John Speakman	Charles Thorpe	Man	—	Found dead in the saw-pit, into which it appeared he fell, and got suffocated amongst the sawdust.	–	–	–	–	1
„ 6	39	Great Boys	Tyldesley	Fletcher and Scowcroft	John Lloyd	Miner	35	Killed by a shot blowing the coal upon him as he returned too soon.	–	–	–	1	–
„ 7	40	Rose Hill	Bolton	Samuel Scowcroft	James Grundy	Ditto	23	Suffocated in firedamp. The pit had not been at work for some days, and the men were allowed to return to work before it had been put right. The deceased passed the danger signal.	–	–	–	1	–
„ 8	41	Allens Green	Radcliffe	Knowles and Hall	Robert Buckley	Ditto	17	Crushed between two waggons. He was going in front of one down a slope, and without a sprag in a wheel.	–	–	–	1	–
Sept. 4	42	Woodhouse Lane	Bagslate	Zachariah and James Howarth.	Richard Birtwisle	Ditto	20	Roof falling in a work, about 7 yards from the entrance.	–	1	–	–	–
„ 11	43	Black Lane	Radcliffe	Rylands and Sons	James Marland	Master sinker.	50	Thrown out of the hoppet as he was coming up the sinking pit. The winding pulley was not in a straight line with the drum, a guide pulley was therefore used, and it appeared that it broke loose and caused the rope to slip off the drum.	–	–	1	–	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.													
Sept. 30	44	Albert -	Westhoughton -	John Gerrard - -	Thomas Hartley -	Miner -	24	Roof falling, not enough props set -	–	1	–	–	–
Oct. 1	45	Singing Clough	Kearsley - - -	Knowles and Stott -	Thomas Heathcote	Engineer -	17	Burned by an explosion of firedamp in the Cannel mine. He drew the staple, by which the entrance was barred and locked, and went into the return airway with an open light as some gas was being driven off by a new cutting into the goaf. Died 6th.	1	–	–	–	–
„ 8	46	Albert -	Hollinwood - -	Chamber Co. - -	William Henry Ogden.	Pony driver	18	Crushed by a waggon. The front end, on which he was riding, broke.	–	–	–	1	–
„ 22	47	Kearsley -	Kearsley - -	Samuel Scowcroft -	James Seddon -	Banksman -	—	Falling down the shaft to the Trencherbone mine. Self-acting fences were provided, but one of them was off at the time for the purpose of taking out a water tank and putting in the cage.	–	–	1	–	–
„ „	48	Tyldesley -	Tyldesley - -	Astley and Tyldesley Co. (Limited).	Roger Cook -	Waggoner -	20	Coal, &c., falling in the 6-feet mine.	–	1	–	–	–
„ 28	49	Broadfield -	Oswaldtwistle -	Thomas Simpson and Co.	Peter Hayes -	Miner -	30	Roof falling as he was taking out part of a pillar of coal.	–	1	–	–	–
Nov. 2	50	Outwood -	Outwood - -	Thomas Fletcher and Sons	Joseph Barlow -	Ditto -	—	Roof of the 2-yards mine falling upon him.	–	1	–	–	–
„ „	51	Elton - -	Bury - - -	William Thornton Parks	George Lowe -	Ditto -	22	Roof falling where he was at work	–	1	–	–	–
„ „	52	Black Lane -	Radcliffe - -	Rylands and Sons -	John Delasay,	Master sinker	28	The brickwork of the shaft which they had put in giving way. They were aware that the bottom had become loosened by two shots, and they had just gone down to make an examination. The rings above ought either to have been plugged underneath, or to have rested on solid ground at the back part.	–	–	3	–	–
					Christopher Green,	Sinker -	30						
					Moses Atkinson.	Sinker -	24						

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.													
Nov. 9	53	Hapton Valley -	Hapton - -	Executors of John Hargreaves.	James Granger -	Waggoner	12	Caught by a waggon in the drawing road. Died 20th.	–	–	–	1	–
„ „	54	Ringley Fold -	Stoneclough -	Knowles and Stott -	Thomas Greenhalgh -	Pit carpenter	36	Falling from part way down the shaft. In getting the broken rope away from the cage, which was held by safety catches, the catches became lifted by the rope, thereby loosening the cage, and he being on the top of it, fell with it to the bottom of the shaft.	–	–	1	–	–
„ 10	55	Cleggswood -	Littleborough -	Robert Knowles and Co.	Henry Butterworth -	Miner -	41	Roof falling in the bay where he was working.	–	1	–	–	–
„ 24	56	Tong - -	Bolton - -	Jethro Scowcroft -	Henry Entwistle -	Ditto -	27	Roof falling in the Little mine, as he was taking the coal down.	–	1	–	–	–
„ 27	57	Burnt Hills -	Wholaw Nook -	Executors of John Hargreaves.	James Ashworth -	Ditto -	45	Roof falling as he was taking out a prop.	–	1	–	–	–
Dec. 12	58	Outwood -	Outwood - -	Thomas Fletcher and Sons	Giles Grundy -	Assistant hooker-on.	12	Crushed by the cage at the 4-feet working. He, apparently, was lifting the catch before the cage had stopped.	–	–	1	–	–
„ 15	59	Lords Fields -	Ashton-under-Lyne	Lords Fields Co. -	James Rushworth -	Miner -	25	Roof falling in a stowage place in the Great mine.	–	1	–	–	–
„ 17	60	Woodpark -	Bardsley - -	Leeses and Booth -	James Chadwick -	Ditto -	26	Collision of waggons. He was pushing an empty tub up a slope when two waggoners with a full tub came down at full speed, there being two screens across the road for turning the air which prevented the waggoners seeing or hearing beyond.	–	–	–	1	–
„ „	61	Clayton	Manchester -	Leigh and Bradbury -	James Lovatt -	Ditto -	30	Roof falling as he was taking a piece of coal out of the side.	–	1	–	–	–
								Total, 61 fatal accidents and 65 deaths	5	33	8	16	3

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List of the Owners and Collieries in the Manchester District of Lancashire, specifying those where Fatal Accidents have taken place, in the Year 1868.

Number.	Owners.	Address.	Collieries.	Where situated.	Fatal Accidents.	Lives lost.
1	Altham Co.	Atham, Accrington	Altham	Altham	1	1
2	Arley Main Co.	Blackrod, Chorley	Park Hall	Blackrod		
3	Edward Ashworth and Co.	Cowpe, Waterfoot, Manchester.	Brandwood Moor	Brandwood Moor.		
4	Ralph Ashworth and Co.	Littleborough	Starring	Littleborough.		
5	Astley and Tyldesley Coal and	Tyldesley, Manchester	Astley,	Astley,		
6	Salt Co. (Limited).		Tyldesley.	Tyldesley	1	1
7	Joseph Bagnall	Royton, Oldham	Higginshaw	Royton.		
8	Bailey and Dronsfield	Oldham	Park	Oldham.		
9	Bankhouse Co.	Bagslate, Rochdale	Bankhouse	Bagslate.		
10	Bardsley Co.	Ashton-under-Lyne	Bardsley	Bardsley	1	1
11	James Barker	Charnock Richard, Chorley.	Pemberton House	Charnock Richard.		
12	James Barlow	Entwistle, Bolton	Cranberry Moss	Over Darwen.		
13	Exors. of Joseph Barnes	Church, Accrington	Dunkenhalgh Park	Church.		
14	Matthew Bennett and Brothers.	Little Hulton, Bolton	Street Gate	Little Hulton.		
15	John G. Blackburne	Oldham	Lowside	Oldham.		
16	Booth and Marland	Ditto	Honeywell Lane	Ditto.		
17	The Earl of Bradford	Great Lever Collieries, Bolton.	Great Lever	Great Lever.		
			Hacken	Darcy Lever.		
			Raikes	Great Lever	1	1
18	Bradford Co.	Bradford, Manchester	Bradford	Manchester	1	1
19	James Brearley and Son	Brandwood Moor, Waterfoot.	Brandwood Moor	Brandwood Moor.		
20	Bridgewater Trustees	Worsley, Manchester.	Ashtonsfield	Little Hulton.		
21			Barracks	Ditto.		
22			Bridgewater	Worsley.		
23			Buckley Lane	Little Hulton.		
24			Burgess Land	Ditto.		
25			Delph	Middle Hulton.		
26			Edge Fold	Worsley.		
27			Ellenbrook	Tyldesley.		
28			Gatley	Ditto.		
29			Howarths Field	Farnworth.		
30			Linnyshaw	Worsley.		
31			Lords Moss Field	Farnworth.		
32			Madams Wood	Little Hulton.		
33			Mangnalls	Worsley	1	1
34			Mosley Common	Tyldesley.		
35			Sanderson	Worsley.		
36			Saplingfield	Middle Hulton.		
37			Tonges Field	Farnworth.		
38			Wardley Coppice Field.	Worsley.		
39	Brimrod Co.	Rochdale	Brimrod	Rochdale.		
40	Brooks and Pickup	Towneley, Burnley	Cupola	Hameldon.		
41			Towneley	Burnley.		
42			Wholaw Nook	Wholaw.		
43	John Buckley	Healey, Rochdale	Birches and Whitewell.	Healey.		
44	Adam Bullough	Waterside, Darwen	Waterside	Eccleshill.		
45	Bury Colliery Co.	Bury	Bury	Bury.		
46	Butterworth and Brooks	Sunnyside, Rawtenstall.	Cragg	Bacup.		
47	Edmund Butterworth and Sons.	Crompton, Oldham	Crow Knowl	Crompton.		
48	The Exors. of James Butterworth.	Bacup	Oaken Clough	Bacup.		
49	James Butterworth and Son	Rochdale	Greenbooth and Knowl.	Wolstenholme.		
50	Thomas Butterworth	Oldham	Bent Grange	Oldham.		
51	Chamber Company	Hollinwood	Oak	Hollinwood	1	1
52			Chamber	Oldham.		
53			Chadderton	Chadderton	1	1
54	Francis Charlton	Little Hulton, Bolton	Wharton	Little Hulton.		
55	Edmund Clegg and Son	Littleborough	Turf House	Littleborough.		

List of the Owners and Collieries in the Manchester District, &c.—*continued.*

Number.	Owners.	Address.	Collieries.	Where situated.	Fatal Accidents.	Lives lost.
56	Clifton and Kearsley Co.	Clifton, Manchester	Botany Bay	Clifton.		
57			Bus	Ditto.		
58			Robin Hood	Ditto.		
59			Manor	Kearsley	2	2
60			Spindlepoint	Ditto.		
61			Wetearth	Clifton.		
62	Cliviger Co.	Cliviger, Burnley	Coppy	Cliviger.		
63			Union	Ditto.		
64	James Collinge and Co.	Oldham	Glodwick	Oldham	1	1
65	Thomas Cross	Halliwell, Bolton	Doffcocker	Halliwell.		
66	Charles Crossley	Wardle, Rochdale	Crook Bank	Wardle.		
67	Darcy Lever Co.	Darcy Lever, Bolton	Darcy Lever	Darcy Lever.		
68	James Darlington	Blainscough Hall Colliery, Coppull, Chorley.	Blainscough Hall	Coppull.		
69			Springfield	Ditto.		
70			Welch Whittle	Welch Whittle	1	1
71	James Dearden	The Orchard, Rochdale.	Cartridge Nook	Wardle.		
72			Handle Hall	Calderbrook.		
73			Italy	Dulesgate.		
74			Land	Shawforth.		
75			South Grain	Dulesgate.		
76			Toadleach	Healey.		
77			Todmorden Moor	Dulesgate.		
78			Tooter Hill	Bacup.		
79			Wallnook	Wardle.		
80	Dewhursts, Hoyles, and Smethurst.	Anderton Hall Colliery, Blackrod, Chorley.	Anderton Hall	Blackrod		
81			Rigby Hill	Ditto.		
82	James Diggle	Westleigh and Heyfield Collieries, Leigh, Manchester.	Heyfield	Westleigh	1	1
83			Owens	Ditto.		
84			Westleigh	Ditto.		
85	Exors. of Lawrence Duckworth.	Sheep Hey, Ramsbottom.	Scout Moor,	Shuttleworth.		
86			Shipperbottom	Walmersley.		
87	T. and J. Eccles	Coney Colliery, Over Darwen.	Coney	Over Darwen.		
88	Eccleshill Co.	Over Darwen	Flash	Eccleshill.		
89	Ralph Entwhistle	Over Darwen	Over Darwen Brickworks.	Over Darwen.		
90	Edmund Fairburn	Wardle, Rochdale	Bank Hey	Wardle.		
91	Fish and Holden	Over Darwen	Old Lyons	Over Darwen.		
92	Nicholas Fish	Rivington, Bolton	Wilderswood	Rivington.		
93	H. H. Fishwick and Co.	Rochdale	Brotherod	Rochdale.		
94	James Fletcher and Brothers	Littleborough	Higher Shore	Littleborough.		
95	John Fletcher	Little Lever, Bolton	Ladyshore	Little Lever.		
96	John Fletcher and others	Atherton Colliery, near Manchester	Chanters	Atherton.		
97			Gibfield	Ditto.		
98			Howbridge	Ditto	1	1
99	Thos. Fletcher	Bradley Fold Collieries, Little Lever, Bolton	Stopes	Little Lever	1	1
100			Bents	Ditto.		
101			Black Moss	Radcliffe.		
102			Breightmet	Breightmet.		
103			Radcliffe Moor	Ainsworth.		
104	Thos. Fletcher and Sons	Near Manchester	Outwood	Outwood	2	2
105	Fletcher and Scowcroft	Great Boys Colliery, Tyldesly	Great Boys	Tyldesley	1	1
106			Pear Tree House	Ditto.		
107	Exors. of Thos. Fogg	Edgeworth, Bolton	Horrocks Court	Edgeworth.		
108	Exors. of Richd. Fort	Great Harwood Colliery, near Accrington	Great Harwood	Great Harwood.		
109			Martholm	Ditto	1	1
110	John Gerrard	Westhoughton, Bolton	Albert	Westhoughton	1	1
111	John Gibson and Co.	Little Hulton, Bolton	Smithfold	Little Hulton.		
112	John Gregory	Leigh, Manchester	Snapes	Westleigh.		
113	Reuben Haigh and Co.	Walsden, Todmorden	Foulclough	Todmorden.		
114	Hall and Rogers	Littleborough	Cleggswood Pottery	Littleborough.		
115	Hall and Urmson	Bagslate, Rochdale	Moss	Bagslate.		
116	James Hardcastle	Firwood, Bolton	Bradshaw and Harwood.	Harwood.		
117	Ditto	Bolton	Breightmet	Breightmet.		
118	James Hardman	Stacksteads	Wellclough	Stacksteads.		

List of the Owners and Collieries in the Manchester District, &c.—*continued.*

Number.	Owners.	Address.	Collieries.	Where situated.	Fatal Accidents.	Lives lost.
119	Exors. of John Hargreaves	Burnley, &c. Collieries, Burnley	Bank Hall	Burnley.		
120			Burnt Hills	Wholaw Nook	1	1
121			Cornfield	Gawthorpe.		
122			Foxclough	Colne.		
123			Gannow	Habergham.		
124			Hapton Valley	Hapton	1	1
125			Marsden	Marsden.		
126			Padiham	Padiham.		
127			Rowley	Burnley.		
128			Whittlefield	Ditto.		
129	Hargreaves, Ashworth and Co.	Baxenden Colliery, Accrington	Cat Hole	Broad Oak	1	1
130			Hole in Band	Accrington.		
131			Victoria	Baxenden.		
132			Wood Nook	Accrington.		
133	Ditto	Rossendale Collieries, Newchurch	Brex	Lower Whitwell Bottom.		
134			Dean	Water.		
135			Foxhill	Middle Whitwell Bottom.		
136			Grime Bridge	Ditto.		
137			Scar End	Ditto.		
138			Meadows	Bacup.		
139			Old Clough	Ditto.		
140			Swinshaw	Crawshaw Booth		
141			Stacksteads	Stacksteads.		
142	Haugh Hey Co.	Rochdale	Haugh Hey	Haugh Hey.		
143	John Haworth	Bury	Cheesden Bar	Bury.		
144	Heaton and Co.	Heath Charnock Pottery, Chorley.	Heath Charnock	Heath Charnock		
145	Heskin Hall Co.	Heskin, Chorley	Heskin	Heskin.		
146	John and Ralph Holden	Over Darwen	Back-o'-th'-height	Blacksnape.		
147	Zech. and James Howarth	Rochdale	Woodhouse Lane	Woodhouse Lane	1	1
148	Wm. Ford Hulton	Bolton	Hulton and	Hulton	1	1
149			Hulton Park	Ditto.		
150	Hurst Co. (Limited)	Ashton-under-Lyne	Hurst	Hurst.		
151	Kay and Wilks	Oldham	Little End	Oldham.		
152	Kershaw Brothers	Littleborough	Longley Hey	Longley Hey.		
153	William Knight	Horwich, Bolton	Newfields	Horwich.		
154	Andrew Knowles & Sons	Pendlebury, Manchester.	Agecroft	Pendlebury	1	1
155			Clifton Hall	Clifton	1	1
156			Clifton Moss	Clifton.		
157			Pendlebury	Pendlebury	2	2
158			Pendleton	Pendleton	1	1
159	Ditto	Little Lever, Bolton	Farnworth Bridge	Little Lever.		
160			Fearneyside	Ditto.		
161			Foggs	Darcy Lever.		
162			Rivin, New	Little Lever.		
163	Ditto	Sharples, Bolton	Sharples	Sharples.		
164	Robert Knowles and Co.	Littleborough	Cleggswood	Littleborough	1	1
165	Knowles and Hall	Radcliffe Colliery, near Manchester.	Radcliffe	Radcliffe	1	1
166			Bank Top	Ditto	1	1
167	Knowles and Stott	Stoneclough, Kearsley, Manchester.	Little Hey	Stoneclough.		
168			Ringleyfold	Ringley	1	1
169			Singingclough	Kearsley	1	1
170	A. and W. Law	Littleborough	Lydgate	Lydgate.		
171	Executors of James I. Law	Bacup	Greave New	Bacup.		
172	Thomas Leach	Stacksteads	Lee	Ditto.		
173	Samuel Leather	Blackrod, Chorley	Dootson Vauze	Blackrod	1	1
174	Robert Lees	Britannia, Bacup	Freeholds	Facit.		
175			New Line	Bacup.		
176	Lees and Ashworth	Hollingworth, Littleborough.	Syke	Hollingworth.		
177	Leeses and Booth	Fairbottom Colliery, Ashton-under-Lyne.	Broad Oak and Moss	Broad Oak.		
178			Dock	Fairbottom.		
179			Hartshead	Hartshead.		
180			Heys.	Ashton-under-Lyne.		
181			Nelson and Rocher	Park.		
182			Woodpark	Bardsley	1	1
183	Lees and Co.	Oldham	Grecnacres	Oldham.		
184	Leeses, Jones, and Co.	Ditto	Holebottom	Ditto	1	1
185			Rhodes Bank	Ditto.		

List of the Owners and Collieries in the Manchester District, &c.—*continued.*

Number.	Owners.	Address.	Collieries.	Where situated.	Fatal Accidents.	Lives lost.
186	Lees and Mayall	Greenacres Moor, Oldham.	Little Mine	Higher Barrowshaw.		
187	Lees and Tetlow	Littleborough	Light Owlers and Pike House.	Littleborough.		
188	Leigh and Bradbury	Denton, Manchester	Broomstair	Denton.		
189	Ditto	Clayton, Manchester	Clayton	Clayton	1	1
190	Limehurst Company	Ashton-under-Lyne	Limehurst	Ashton-under-Lyne.		
191	Lomax and Co.	Rochdale	Smallbridge	Smallbridge.		
192	John Lomax and Co.	Rochdale	Old Sink and Greenlands.	Rowley Moor.		
193	John and Nathl. Longworth	Westhoughton, Bolton	Brinsop	Westhoughton.		
194	John Lord	Bacup	Deansgreave	Bacup.		
195	Samuel Lord and Brothers	Wolstenholme, Rochdale.	Bamford Closes	Wolstenholme.		
196	Lords Fields Co.	Ashton-under-Lyne	Lords Fields	Ashton-under-Lyne.	1	1
197	Mrs. Ann Maden	Bacup	Hogshead	Bacup.		
198	Messrs. Marland	Hollinwood, Manchester.	Bower	Hollinwood	1	1
199	George Maxwell	Bacup.	Greave Clough	Bacup.		
200	Adam Mason	Horwich, Bolton	Winter Hill	Horwich.		
201	Mayall and Seddon	Oldham	Lower Moor	Oldham	1	1
202	Meadow Head Co.	Rochdale	Meadow Head	Wolstenholme.		
203	George Mellodew	Oldham	Hodgeclough	Oldham.		
204	E. D. Milnes and Brother	Birtle, Bury	Cob House	Birtle.		
205	Moscrop Brothers	Wolstenholme, Rochdale	Red Lumb	Wolstenholme.		
206	John Newby	Millhouses, Hornby, Lancaster.	Smear Hall	Wray-with-Botton.		
207	Peter Nightingale and Co.	Worsley, Manchester	Mesne Lea	Worsley.		
208	Norley Hall Co.	Coppull, Chorley	Coppull Hall	Coppull.		
209	Oldham, Middleton and Rochdale Co. (Limited)	Edge Lane, Oldham	Bankhouse	Crompton	1	1
210			Sholver	Ditto.		
211			Boarshaw	Middleton.		
212			Hopwood	Ditto.		
213			Hanging Chadder	Rochdale.		
214			Low Crompton	Ditto.		
215			Hartford	Oldham.		
216			Jubilee	Crompton.		
217			Lee	Chadderton.		
218			Robin Hill	Oldham.		
219	John Parkinson Parke	Withnell Hall, Chorley	Withnell	Withnell.		
220	Wm. Thornton Parks	Bury	Elton	Elton	1	1
221	Andrew Peake	Horwich, Bolton	Wildersmoor	Horwich.		
222	Wm. Pickup	Over Darwen	Pole	Over Darwen.		
223	Joseph Place	Ditto	Hoddlesden	Hoddlesden.		
224	Thos. Ramsbottom and Sons	Birtle, Bury	Birtle Dean	Birtle.		
225	William Ramsden	Tyldesley	Messhing Trees	Tyldesley.		
226			Shakerley	Shakerley.		
227	Ralph Rawstron	Whitworth, Rochdale	Bridge Mills	Whitworth.		
228	Ditto	Bagslate, Rochdale	Old Clap Gate	Bagslate.		
229	Rawstrons and Stott	Littleborough	Rake Pottery	Littleborough.		
230	Rochdale Brick and Tile Co. (Limited).	Summit, Littleborough	Chelburn	Summit.		
231	John Rosbottom and Sons	Heath Charnock, Chorley.	Rawlinson	Heath Charnock.		
232	Ditto	Rumworth, Bolton	Victoria	Rumworth.		
233	James and William Roscoe	Little Hulton, Bolton	New Lester	Tyldesley.		
234			New Watergate and Peel Hall.	Little Hulton.		
235	Roscow and Lord	Rochdale	Chadwick Hall	Rochdale	2	3
236	Ditto	Ditto	Crow Nest	Milnrow.		
237	Ditto	Farnworth, Bolton	Stonehill	Farnworth.		
238	Peter Rothwell	Denton, Manchester	Denton	Denton.		
239	Rylands and Sons	Radcliffe, Manchester	Cockey Moor	Black Lane	2	4
240	Schofield & Co.	Smallbridge, Rochdale	Dearnley	Smallbridge	1	2
241	Jethro Scowcroft	Bolton	Tonge	Bolton	1	1
242	Samuel Scowcroft	Kearsley, Bolton	Kearsley	Kearsley	2	2
243	Ditto	Burnden, Bolton	Rose Hill	Burnden	1	1
244	John Seddon	Darcy Lever, Bolton	Top o'-th'-Meadow	Darcy Lever.		
245	Thomas Shaw and Sons	Haughton, Manchester	Haughton and	Haughton.		
246			Haughton Green	Ditto	1	1

List of the Owners and Collieries in the Manchester District, &c.—*continued.*

Number.	Owners.	Address.	Collieries.	Where situated.	Fatal Accidents.	Lives lost.
247	Sheep Bank Co.	Littleborough	Sheepbank	Littleborough.		
248	Shorey Bank Co.	Over Darwen	Shorey Bank	Over Darwen.		
249	Eccles Shorrock, Brothers and Co.	Ditto	Dogshaw	Ditto.		
250			Jacks Kay	Ditto.		
251	Thomas Simpson	Blackburn	Lower Darwen	Lower Darwen.		
252	Thomas Simpson and Co.	Oswaldtwistle Collieries, near Accrington	Aspin	Oswaldtwistle.		
253			Belthorn			
254			Broadfield		1	1
255			Duckworth Hall			
256			Mossfield			
257			Stanhill			
258	John Smith, jun., and Co.	Great Lever, Bolton	Great Lever Works	Great Lever.		
259	Smithson and Butterworth	Facit, Rochdale	Hudclough	Facit	1	1
260	John Speakman	Westleigh, Manchester.	Broadfield	Westleigh	2	2
261	Stand Lane Co.	Radcliffe	Stand Lane	Pilkington.		
262			Whitefield	Pilkington.		
263	Exors. of John Stanley	Failsworth, Manchester.	Moston	Moston	1	1
264	James Stott	Kearsley, Bolton	Unity Brook	Kearsley.		
265	Richard and William Stott	Rochdale	Ashworth	Ashworth.		
266			Butterworth Hall	Milnrow.		
267			Tunshill	Ditto.		
268	Stott, Bamford and Co.	Wardle, Rochdale	Birch Hey	Wardle.		
269	James Taylor	Bacup	New Barn Brickworks.	Bacup.		
270	Thomas Temperley	Todmorden	Clough Head Brickworks.	Dulesgate.		
271	Tetlow, Lees, and Kershaw	Littleborough	Sladen Mills	Littleborough.		
272	Townsend and Co.	Greaves Collieries, Bacup	Britannia	Bacup.		
273			Greave	Ditto.		
274			High Houses	Ditto.		
275			Sharneyford	Ditto.		
276	Edward Turner	Birtle, Bury	Openshaw	Birtle.		
277	Turton Moor Co.	Turton, Bolton	Turton Moor Brickworks.	Turton.		
278	Samuel Tweedale	Rochdale	Tonnacliffe	Tonnacliffe.		
279	Jacob Tweedale and Sons	Ditto	Healey Hall Bottoms.	Healey Hall.		
280	Tyldesley Co.	Tyldesley	Tyldesley	Tyldesley.		
281			Combermere	Ditto.		
282	Eli Walsh	Over Darwen	Heyfold	Over Darwen.		
283	Thomas Whaley	Blackrod, Chorley	Blackrod	Blackrod.		
284	The Whitaker Co.	Whitaker, Littleborough.	Whitaker	Whitaker.		
285	Thomas Whittle	Blackrod, Chorley	Marklands	Blackrod.		
286		Chorley	Duxbury and Chorley.	Duxbury. Chorley.		
287	Charles Whowell	Two Brooks, Tottington, Bury.	Monk's Bank	Quarlton.		
288	Wigan Coal and Iron Co. (Limited.)	Westleigh, Manchester.	Nos. 1 and 2	Westleigh	1	1
289	John Sutcliffe Witham	Hapton, Burnley	Hapton	Hapton.		
290	John Woodhead	Waterfoot, Manchester.	Intake	Brandwood Moor		
291	William Woods and Son	Blackrod, Chorley	Scot Lane	Blackrod.		
292	Exors. of John Wright	Little Hulton, Bolton	Bank	Little Hulton	1	1
				Total	61	65

I have, &c.
(Signed) JOSEPH DICKINSON,
Inspector of Coal Mines.

The Right Hon. Henry Austin Bruce, M.P.,
Principal Secretary of State,
Whitehall.

Mr. Higson's Report.

Report of the Working of the Mines Inspection Act (23 & 24 Vict. c. 151.) in the West Lancashire and North Wales District, during the Year ended 31st December 1868.—By Peter Higson, Esq.

Sir, Swinton, Manchester, February 28th, 1869.

I have the honour to transmit the following Report of my proceedings as Inspector of the Mines of coal and ironstone in the District comprising South-west Lancashire and North Wales during the year 1868.

The period to which the following observations refer was one of great and unusual calamity, which will be long and deeply regretted. It began by a three months' strike of the coal miners of South-west Lancashire, during which all mining operations in that locality were entirely suspended, and it terminated with a succession of such deplorable casualties and loss of life as had not for years before happened in the District.

While investigating the character and origin of many of these serious accidents, I was much impressed with their connection with other events, past and present. The long strike, the stagnation of trade, the excitement of the times, and the county and borough elections also, caused the workings to be in some measure neglected, and the workpeople to become idle, careless, and in fact demoralized. When the time for active exertion arrived, everybody and everything was out of tune; the works required carefully handling, but the head and hand of the workman had forgot their cunning, and then followed those disasters which I shall attempt herein-after to describe.

The number of lives lost in the year 1868 is greater than that in the year 1867 by 103, and the number of fatal accidents by 8.

This large increase in the loss of life has been caused principally by the explosions of fire-damp at the Wynnstay Colliery near Ruabon, the Hindley Green Colliery near Wigan, the Haydock Colliery near St. Helen's, and at the Norley Colliery, in Pemberton near Wigan, by which in the aggregate 106 persons were killed. From many other causes also loss of life has too often happened, very frequently, I regret to say, from ignorance or negligence, and occasionally by misadventure.

The casualty at the Wynnstay Colliery, which will be found herein-after more particularly described, occurred through inadequate supervision of the workings; the Hindley Green catastrophe happened primarily from the same cause, combined with the unskilful firing of a shot. The working and adjoining places of the Haydock Colliery could not have been carefully examined by the fireman on that fatal day, or the gas which exploded would have been found, and its safe removal required no unusual skill: that it was ignited by the firing of a shot in the adjoining place there can be no doubt. In the case of Norley, the fireman carried his own life and the lives of seven others, then in different parts of the mine, in his own hands. He was employed to make a careful examination of all the working places of that particular district of the workings every morning, before the workpeople entered therein. The result shows clearly that no such inspection had been made.

In all these lamentable occurrences, except only that at Ruabon, the fireman perished with the rest. Not a soul therefore was left to tell the state of things in the mine below, on the morning of those fatal days. The fireman of the Ruabon Works stated in evidence that he made an inspection of the place in which the gas had or was supposed to have accumulated, early on that morning, and found it then clear of gas, and, as usual, safe; there was however some discrepancy in his evidence. The time when such inspection was said to have been made, and that of his being seen in other places, was too short to have enabled him to do so in a proper manner, consequently his evidence had little or no weight with the jury.

These facts have contributed largely to show the character of the class of men on whom we have to rely in a great measure for the safety of our coal mines. That in the number employed there are many trustworthy men, I willingly admit; but there are a great number who are ignorant of their business and who are, if not reckless actually, negligent and unthoughtful. Many, I may say a majority, can neither read nor write, though such are not, generally, the least to be relied on. Intemperance is one great and

primary cause of incapacity and neglect, and to it may be traced the origin of many casualties. The close proximity of beer houses to the mines and works under consideration is an evil which loudly calls for legislative interference.

It may be argued that the owners of mines should employ more competent men to act as firemen. But such men are scarce in this district. Within the last 10 years the out-turn of coal has been nearly doubled; this has caused a great number of strangers to be employed, strangers not only to the workings of these mines, but to the dangers by which they are surrounded, from gas, &c., and whose characters for skill, sobriety, and care are unknown. The best colliers also can now get higher wages than formerly, and consequently prefer getting coal to being employed as firemen, which would take them from home at a much earlier hour in the morning. This scarcity will continue till such times as a class of young and better educated men have been trained for the office, and are capable of efficiently discharging the various and important duties which the nature of the appointment invariably requires.

I find, however, that firemen are frequently compelled to act as labourers by filling up their time, after having made an inspection of the working places of the men, in dressing roads, &c., and other ordinary occupation. This has an injurious effect on the discipline of the people employed. To some extent it lowers the position of the firemen, and thereby lessens their authority over the men, and diminishes the opportunities they would otherwise have of properly considering their duties, and making constant alterations and improvements in the works. It is somewhat different with assistant firemen, but their extra duties should never extend beyond fixing brattice to keep the current of air up to the extremity of the working places. A great number of these men can neither read nor write, and their general tone and character is seldom above that of the average of the working colliers; while in some cases the underlookers are little, if any, superior in any respect to the firemen.

Energetic and unwearied efforts are, however, being made to alter this state of things. A great number of very excellent schools have been built, and competent schoolmasters appointed, in almost every part of the district, by the owners of the mines and collieries, some of which are now nearly self-supporting. Nearly all the employers of labour now prohibit boys under the age of 12 years working below ground, and though that restriction may be sometimes evaded, it is upon the whole pretty well enforced; and it is now an ordinary thing to find a school containing from 50 to 100 boys of all ages from 12 years downwards. This must manifestly be preparing the rising generation for the battle of life, if not in the very best manner possible, at least very satisfactorily; and that the system now so well established will go on, and, like a sapling well planted, gain strength and vigour from year to year, till it becomes a tall and majestic tree, is much to be desired. I have no favourable report to give of the state of adults, they are much the same as they were a dozen years ago, both males and females; and no tangible improvement need be expected, inasmuch as none will, in my opinion, ever take place. It cannot, however, be considered that the system of primary education is properly established while that of females is all but ignored; hundreds of untaught girls are daily employed on out-door labour, for which the law makes no provision. They contrive, in some instances, to gather, as it were, the crumbs of education which the boys wantonly scatter; and in many of the first class schools, like those of Haigh, Haydock, Park Lane, and in Ince, they are well provided with the means of learning; in all these places, except one of the schools in Ince, by the benevolence of the colliery owners, who take proper interest in the welfare of the children of their workpeople; but where the owners have not provided schools, the age and education of boys only are observed.

Although I am still of opinion that the Act is working satisfactorily, the existing provisions require in this respect a little amendment. The enactment that requires the attendance of a boy under 12 years of age two days a week at school, 3 hours each day, prevents him from going to work on those days, which would cause him to lose his employment. This deprives a widow with a large family of the means of realizing an income from the labour of her children in many instances; so that I am of opinion that if the time of attendance at school was altered to 3 days a week, and the hours for each lesson from 3 hours to 2, the value of the measure would be greatly improved.

Mr. Johnson, one of the Inspectors of Schools, having stated, in his report for the year 1867, that in South-west Lancashire the Act, so far as it relates to the education of children of tender age, was not strictly observed, I received instructions from the late Secretary of State, the Right Honourable Gathorne Hardy, to make strict inquiries as to the same, and to report thereon. Pursuant to his request, I visited all the principal schools in the district, and thereby traced the rumour back to its source. I found that in some instances the provisions of the Act had been ignorantly violated; in others the

schoolmaster, not knowing the Act, had given certificates of irregular attendance, summing up the number of hours of attendance for the week, but in every case to boys beyond the age at which a certificate can be demanded. This irregularity prevailed more in dissenters' schools than in those connected with the Established Church, although the children are equally well taught there. At the Roman Catholic schools in and about Wigan I found a great many boys in attendance who had passed the age of 12 years. In all cases I was agreeably surprised to find that so much had already been done, and that improvements were still progressing most satisfactorily for the future welfare of the rising generation. There is, however, still great scope for the benevolent, plenty of unexplored ground, to reclaim, thousands of unemployed who cannot read, wanderers in the streets and lanes till the time arrives when the Act empowers them to begin to work in the mines. Many of these will never, perhaps, fall into the way of earning an honest living by their own industry, but will remain through life outcasts from the lower stratum of society, even though they do not sink still lower than that, and become criminal characters. This state of things proves beyond all question of doubt, that unless education be made compulsory generally, we shall still have a large population of ignorant labourers, intemperate, immoral, and unmanageable; and this will be promoted by the decision of many of the large mine owners, who now refuse to employ boys under the age of 12 years.

For the purpose of raising the standard of the management of mines, it is necessary that the underlookers and firemen should be trained for the better discharge of their duties, for which, at present, no provisions have been made. Some years ago a mining school was established at Wigan, but it has made little or no progress. The lectures given there have been scientific, not practical, and to the sons of those persons who could obtain instruction in other places No practical teaching or technical learning of the men who have to manage our mines has been attempted, so that those who stand so much in need of further information have hitherto derived no benefit from any source whatever. If the Wigan mining school were to be re-arranged, so that a number of hours in every week could be set apart for instructing underlookers and firemen to discharge more efficiently their very difficult and onerous duties, greater advantages to the owners and workers of mines would immediately accrue. Lectures on chemistry, to uneducated men, are nothing less than time wasted, as the result already proves.

It is much to be regretted that the owners of collieries do not in all cases select for underlookers and firemen a better class of men, and that they omit to have them specially trained for their duties. It still too often happens that the chief manager is not a competent miner; in such instances the under ground officers are not as a rule judiciously selected, which renders the supervision not only difficult, but defective. Proper provisions are either deferred too long, or inadequately made, the purchase of materials becomes irregular, and an honest statement of facts in due time is invariably withheld. If the chief manager of a mine has not sufficient practical knowledge, a viewer or mining engineer should be employed to superintend the working and ventilation of the same. And in all mines the underlookers and firemen should not only be able to read and write, but they should have sufficient knowledge of ventilation, of the best mode of fixing supports for the roof and sides of the mine, of opening out the same so as to remove the material thereof at the least possible cost, and with the greatest safety during present and future operations, and to acquire that authority and control over the workpeople, in the absence of which all attempt at management completely fails.

The workpeople are rough, and in many instances disobedient; they do not properly observe the provisions of the special rules. They neglect to prop and sprag the roof and sides of the mine. They descend and ascend the pit contrary to published instructions. They charge shots defectively, which frequently blow out in a vitiated atmosphere, and cause an explosion. If the roof sounds well in answer to the blow of a hammer, they neglect to prop it till it falls and causes loss of life. They run the boxes below ground at a random pace, regardless of any one being in the way, by which loss of life or serious personal injury frequently happens. They open or interfere with their safety lamps, so as to enable them to smoke below ground, which is strictly prohibited. By these and other such irregularities, such accidents as I have herein-after to describe have happened. It is seldom, however, that they have been caused by old and experienced colliers or mining men, but chiefly by strangers to the mine, or those who began late in life to follow the employment, or by the young and inexperienced. It may show a great want of discipline, but that most important element in mining is most difficult to establish and maintain. Under the circumstances, therefore, I have been induced to issue the following circular letter to all the colliery owners of the district, in order that it may be distributed and read to or by those they employ.

Inspection of Mines, South-west Lancashire and North Wales District.

(Acts 23 & 24 Vict. c. 151; 5 & 6 Vict. c. 99; and 25 & 26 Vict. c. 79.)

Circular letter, January 1st, 1869.

The number of casualties and the great and serious loss of life in and about the coal mines of this district in the year 1868 must have produced the most painful reflections.

They have placed those immediately connected therewith in an unenviable position before the public, and they have drawn the attention of all to a state of things which should cease to exist as soon as possible.

The accidents referred to herein have happened from explosions of inflammable gas and gunpowder, from shots igniting while being stemmed, from falls of roof and falls of coal, from recklessly running trams and tubs below ground, by travelling on and being at the foot of inclined planes while the machinery was in motion, from unskilful winding, from incautiously moving railway trucks above ground, and by attempting to extinguish standing fires in mines with water.

I find that firemen and coal miners neglect to fix props and sprags till the places become actually dangerous from falls. They trust to sounding the roof and sides with a hammer or pick, although they must now know that large blocks of stone will sound solid and then fall without warning. To avoid loss of life from this source almost daily caution seems necessary, props should be regularly fixed in all working places within a short distance from the face, even though the roof may appear to be safe.

The great loss of life from the unskilful use of gunpowder clearly proves that blasting in mines which emit inflammable gas should be at once discontinued for getting coal. In those mines which do not give off gas it should only be allowed under competent supervision.

In blasting, an iron instead of a wooden or copper rammer is still too often used in getting the wadding and first part of the stemming fairly bedded on the powder; shots which have missed fire are still drawn, although experience shows that, even with water in the hole, the drill goes in advance and ignites the powder. When a charge has missed fire it should not be drawn, but a second shot should be placed so near as to fire both charges. No work-person should be allowed to take down the pit more gunpowder than he will require in one day.

As brattice so frequently gets disarranged, strong objections will be raised in future to its extensive use. Although it may be indispensable for conducting the ventilation from one cut through to another on the main roads when the length is limited, it should not be made a reliable means of ventilating workings in previously unexplored ground, nor until the gas has been partially drained off by double air roads.

Many lives are lost annually on inclined planes, which has rendered the absolute necessity of preventing persons going thereon, and of preparing separate and distinct roads for them to travel on to and from their work, an obvious and unquestionable result.

I have to call your attention to a system which has recently grown into a source of evil. It is that of leaving small pillars of unworked coal too far behind the main group of workings, surrounded on three sides by the goaf: such outlying portions of coal can only be recovered under great and unnecessary risk, loss of life therefrom being of frequent occurrence. This, generally, is an unmistakable mark of bad management which should in all cases be avoided.

Several mines having recently taken fire, by unsuccessful efforts to extinguish which, many lives have been lost, I take this opportunity of suggesting for your future guidance that the safest way of putting out a fire is to prevent the access to it of atmospheric air.

I have also to call your attention to the 8th General Rule of the Act 23d & 24th Vict. cap. 151., which does not appear to have been generally observed, and to remind you that for any neglect or omission thereof, or of the special rules thereunder established, proceedings against you may be taken under the powers granted by the said Act; and

I do hereby give you notice, that I require covers to be provided and used overhead when lowering or raising persons in all working pits or shafts, except in those worked by a gin or windlass, or when sinking or attending to the pumps, or in special cases for which any written exemption has been previously obtained.

Peter Higson,
Inspector of Mines.

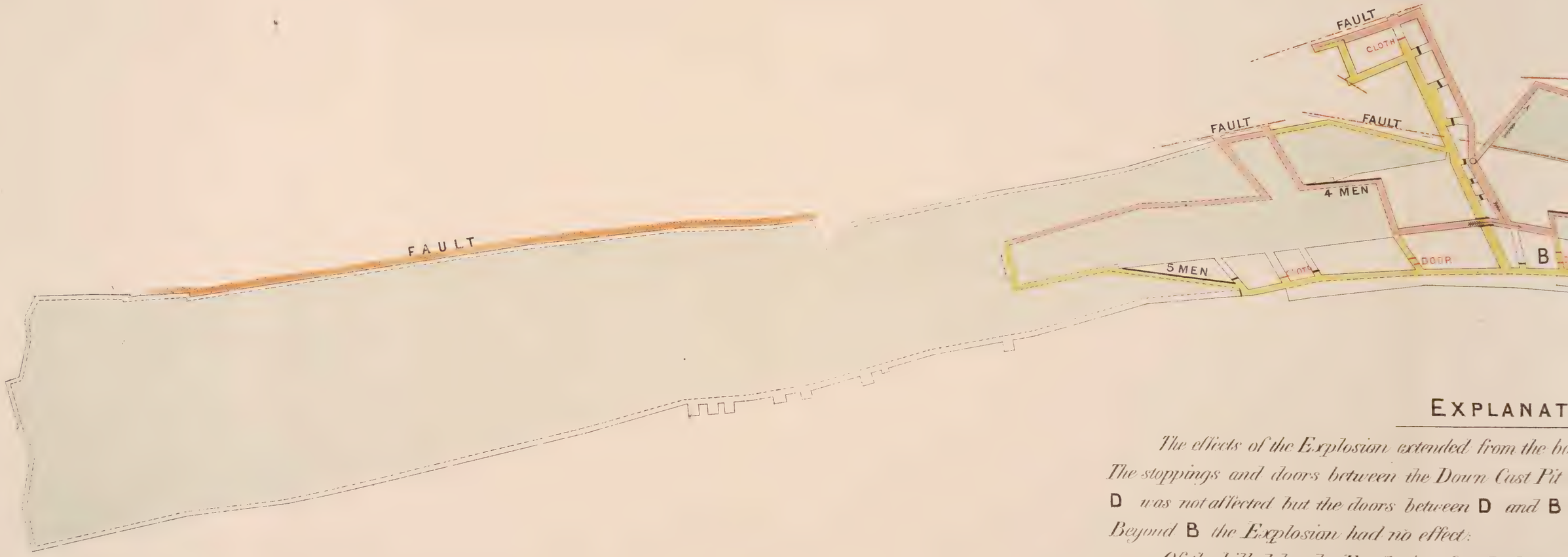
Swinton, near Manchester.

WYNNSTAY COLLI

PLAN SHEWING VENTILATION IN THE MAIN CO

ON THE 30TH SE

Scale 2 Chai



EXPLANAT

The effects of the Explosion extended from the ba
The stoppings and doors between the Down Cast Pit
D *was not affected but the doors between* D *and* B
Beyond B *the Explosion had no effect.*

Of the killed by the Explosion One body was
C *three at* F *another at* E *and Four in the wo*

Those burnt were on the Level between the Dow
to the New Coal.

1 Engine house, 2 Intended Boiler house with
between return air course, 3 Stopping being put up

...RY NEAR RUABON

..., SOUTH LEVEL, AT THE TIME OF THE EXPLOSION.

...EMBER 1868.

... to an Inch.

...N.

... of the Down Cast Pit to A *and to* B.
... C were blown into the Level. The stopping
... blown up-hill towards the working places.

... and at H *on the Level road, another at*
... places K.
... Pit and H, *and One in the Crossing*

... yards Pillar between them and three yards
... the time of Explosion.

REFERENCE.

Coal worked coloured thus	
Working Places „	
Intake Air shewn thus	
Return Air „	
Stoppings „	L
Doors with Cloths at back	DOOR
Regulators	R

H 1	*Thomas Ward*	*Suffocated*
C 2	*Henry Davies*	*Killed*
F 3	*John Brown*	*Suffocated*
	Moses Andrew	*Dº*
	David Roberts	*Dº*
E 4	*John Lloyd*	*Dº & Slightly burnt*
K 5	*James Davies*	*Dº*
	Hugh Edwards	*Dº*
	Edward Edwards	*Dº*
	Meshech Jones	*Dº*

Vincent Brooks, Day & Son Lith.

In the early part of the year a remarkable accident happened at the Afon-ietha Colliery, near Ruabon in Denbighshire, in consequence of the non-observance of the Act 25th & 26th Vict. cap. 79., which requires two entrances to every mine. A second shaft had been once provided and suffered to close, so that at the time in question there was only one pit or shaft in use; this also collapsed while several men were in the workings below. Luckily, all but a man and a boy were got out safely in good time, but these poor creatures were entombed alive, and after being confined in the workings for eight days they were safely recovered, and are now living. At the time this occurred I was confined to bed, so that the investigation was made by my colleague Mr. Dickenson, and by him proceedings were taken against the owner for having committed a breach of the before-mentioned Act, when a penalty was recovered.

A somewhat similar accident happened at the Mesnes Colliery in the borough of Wigan, but unfortunately three lives were lost. They were engaged making improvements near the eye of the pit, when they were suddenly killed by an unexpected fall from the roof and sides. This, however, appeared to have been an unforeseen accident, for which previous provisions to avoid could hardly be expected.

Explosions and Loss of Life :—Swan Lane Colliery.

This explosion, which caused the death of one man, and of two others who perished in the after-damp in attempting his rescue, happened in the extreme rise workings of the four-feet mine at the above colliery. Charles Abbott, a collier, who was sent to the top of a jig-brow by the underground manager, went into his own working-place beyond, and having a naked light he fired some gas which, for want of brattice, had accumulated therein; an explosion took place which caused his death. The underground manager and two others heard the explosion, and went into the foul air to get him out. The two men were suffocated in the after-damp, but the manager was rescued, and, although insensible many hours, subsequently recovered. In this instance, care should have been taken to replace the stoppings, and, by means of brattice, remove the foul air before they went into the place. Proceedings were taken against the owner under the provisions of the Act, for having neglected to observe the first general rule, by which a penalty of 5*l.* was recovered. There was manifestly a conspicuous absence of discipline at the works, and the management was ineffective. A crowd of noisy, rude, and apparently intemperate fellows surrounded the inquest room during the inquiry, seemingly with the object of misdirecting the course of justice.

Wynnstay Colliery.

On referring to the plan annexed of the workings of this mine, it will be observed that on the south side of the pit, in the main coal seam, three up-brows have been driven towards the rise or outcrop thereof within a short distance of the pit eye. They were ventilated by a split of air from the main inbye current going along the horse road below, and borne to the top by doors and stoppings placed in the end ways, by which at intervals they were connected. In the second level or end way from the bottom a door had been in existence for some time, but it was removed a few days before the explosion. On that unfortunate day a bricksetter was employed to build a brick stopping in its place. Immediately after the stopping was completed the explosion took place, which caused the death of 10 persons, all of whom were found near the eye of the pit quite dead. It is manifest that the places in question must have been rendered foul during the time the door was absent, as the wind would go the shortest way to the upcast pit for that period; that on the stopping being completed it was again forced up the brows, when gas, which must have accumulated there, was removed by the current, and that in passing away it came in contact with flame, by which it was ignited, which caused the explosion. I found numerous sparks issuing from the furnace, which was fed with fresh air; but any other flame on or near the air-course could not be discovered or traced to have been there at the time. Two day-wage men had been there a short time before the explosion, but they worked with lamps locked and safe. They were on the other side of the pit at the time, and received no injury. The inquiry was long and searching; great efforts were made to ascertain how the gas was ignited, but they completely failed, so that it is still enveloped in a cloud of mystery. I have, however, after mature deliberation, come to the conclusion that some of the deceased persons must have gone through the doors near the eye of the downcast pit into the return air-course, and there, perhaps for the purpose of smoking, exposed a naked light, which was proved to have been done before, and there ignited the gas which must have been passing at the time to the upcast pit. But I could not overlook the fact of sparks issuing like strings or ropes of fire from the furnace into the foul air in the upcast shaft, the danger of which

I pointed out to the manager, together with many other improvements, including that of another pit or shaft, some of which are now nearly completed, and the rest under consideration. The fireman told the jury that he had examined and found the up-brows safe on the morning of the casualty, but that statement could hardly be relied upon, inasmuch as it was not supported by the evidence of several trustworthy witnesses; my own impression being that those places had not been visited for some time by any one. As there was no trace of burning in or near the upcast pit, the gas, I think, could not have been ignited by anything that came from the furnace. Safety lamps were used below ground.

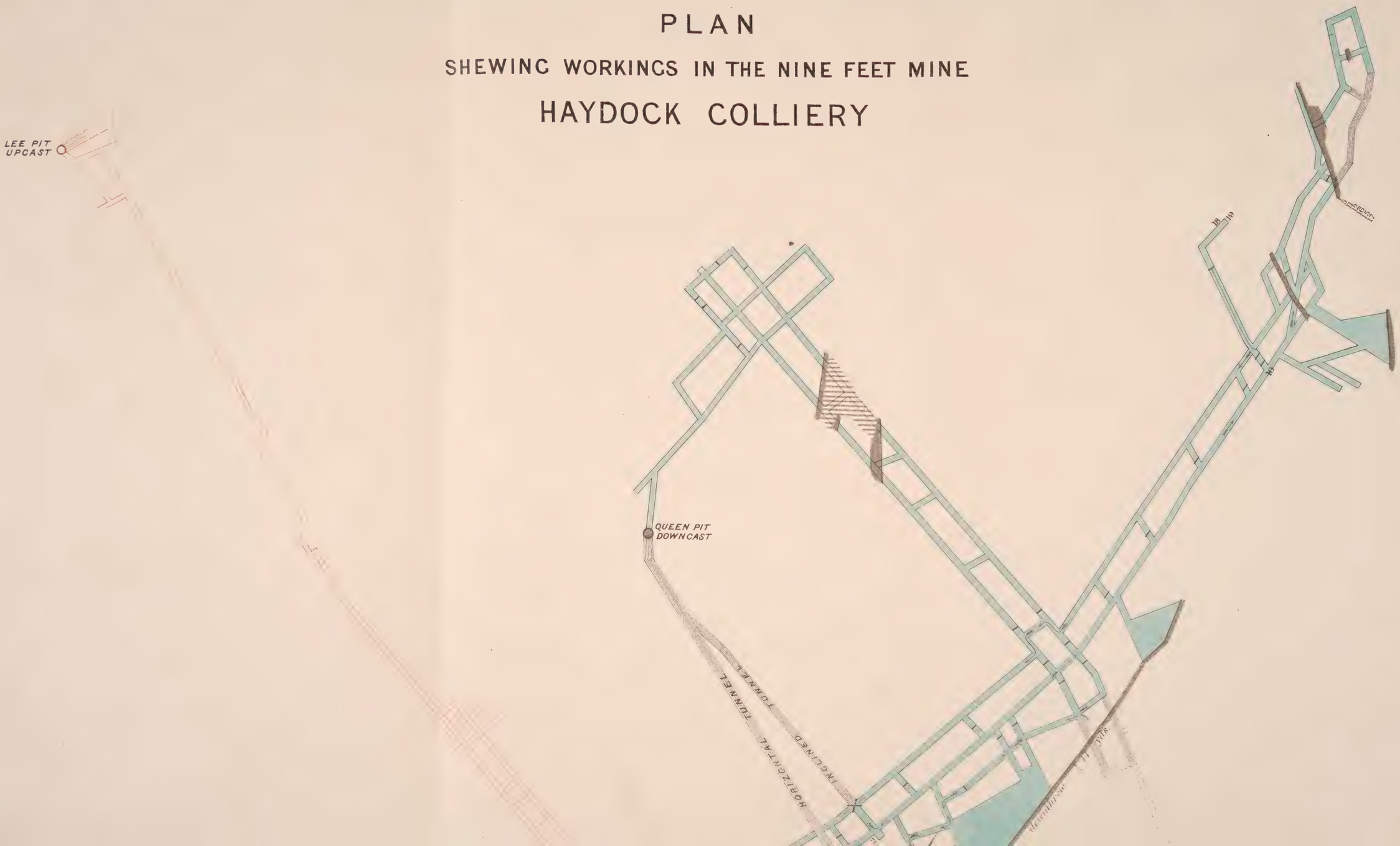
Haydock Colliery.

This casualty, which caused the death of 26 persons, happened in the 9-feet mine of this colliery on the day mentioned in the list of accidents hereunto annexed. The plan attached to this report shows the limited extent of the workings, which were only being opened out at the time to prepare for a more approved system of working and conducting the ventilation. Although the mine makes gas, it cannot correctly be called fiery, or be worked without the use of gunpowder. This explosion, in addition to the loss of life, did a considerable amount of damage; besides falls of roof, and the destruction of doors and stoppings, the flame was severely felt more than 900 yards from the spot where the gas was evidently ignited, by, as was satisfactorily ascertained, a blown-out shot. One of the colliers, as I found, had drilled two holes into the same block of coal; the first had not removed the coal, the second appears to have blown out, which would produce great flame, and whether it ignited some gas in the end-way above, or, by a readjustment of the brattice gas, was being removed therefrom into the road below, where the shot was being fired, there was nothing to show. But the fireman, who was found among the dead, was apparently returning from that part of the workings, and was supposed to have found the brattice down, and by putting it up without due consideration as to the result, turned the air upon the gas accumulated in the place marked B. on the plan, and thereby drove it into the place marked A. below, and that it was passing through it at the time the shot was being fired by one of the deceased. The place B., in which I am confident gas had been accumulated, had been standing some time, and the ventilation of the same conducted by brattice. It was a sound and natural conclusion to draw from these facts that the brattice had been down, that gas had accumulated in consequence; that as no one had been working in the place for some time, it had not been examined daily by the fireman, as required by the rules of the colliery; and that the gas was not known of by him, and that it was ignited either in one or other of the two modes herein described. These frequent casualties have disclosed the painful fact that firemen have omitted to make an inspection of places not in actual work, although situate near those workings in which men are daily employed: this shows a serious neglect of duty, into which the owners of mines should make constant and minute enquiry, and provide a check on their proceedings, whereby any neglect or omission may be detected to prevent accidents occurring. It having recently become the practice to conduct the ventilation of workings by means of brattice cloth to a considerable extent, on the grounds no doubt of economy, though some allege of safety in the event of an explosion taking place, the system cannot be allowed to go on, nor be too soon discontinued. Brattice makes but a delicate and unreliable partition, as it is liable to be broken down by the slightest fall from the roof; it requires constant and unremitted attention on the part of every one in any way connected with the working of a mine, which experience shows is seldom or never given in the manner and form absolutely required. It did not appear that the underlooker of this mine had inspected the place in which the gas was fired for some time previously, relying on the fireman seeing that it was safe. Two days before a collier was sent to make a cut through into the parallel road from B. to A., but he did not go to the end by 10 or 12 yards. Neither the underlooker nor the fireman went with this man, who was a stranger to the mine, and ignorant of gas and the mode of dealing with it. He was absent on the day of the explosion, and thereby escaped the catastrophe. The owners of this mine would do anything to prevent such a casualty as this, and I have always believed the colliery to be exceedingly well managed. In opening out large areas of new ground it is a great mistake to conduct the ventilation by means of brattice, except only from one cut through into a parallel road to another, which should not in any case exceed 20 yards, and in no instance should bratticed places be suspended until they have been opened out at the extreme ends, and communications made with the adjoining place or places, so that the ventilation may be free from risk. To leave endways or other places depending for their ventilation on brattice is in all cases to provide the means of a casualty sooner or later, which the facts contained in these pages prove beyond any question and doubt; and such practices will not be passed unnoticed.

PLAN

SHEWING WORKINGS IN THE NINE FEET MINE

HAYDOCK COLLIERY



Fallen up
Fallen up
WELL sunk from
80 Feet Mine to
Nine Feet Mine
Main Dell Workings
Main Dell Workings
Main Dell Workings
FAULT
B
A
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Plate 2.

HINDLEY GREEN COLLIERY

Plan of

WORKINGS OF THE ARLEY MINE

WEST OF SHAFT

Belonging to Messrs. Jno. Scowcroft & Co. Limited

Explanation

- *Brattice cloths*
- *Stoppings not blown down*
- *Do blown down*
- *Doors blown down*
- *Air courses*
- *Bratticing*

W. Holcroft
John Berry
Thos. Greenhalgh
Robt Haslam
Jas. Johnson
Jos. Greenhalgh
Thos. Kaye
Jas Houghton
W. Haslam
Thos. Ashurst
Jas Latham
Abm Grundy
Abel Haslam
Jas. Nicholson
Saml Hayes
Jas. Pilkington
John Kirkpatrick
Jas. Ramsdale
W. Markland
W. Johnson
Thos. Starkie
Cardliffe's brow
Kehurst's brow
Hussey's brow
Griffith's brow
Holding's brow
Ingram's brow
Setter's brow
Return Air Course
Dr drain
Metal Men
Booth, Halliwell, Crook, Ingham,
Wood & Gregory
D Stunt
Allen with dr
Sargent
Isherwood's slant
Regulator
Dirt
Upcast
Furnace
Downcast
C
Jno Kendrick
Jno Holcroft
W. Isherwood
R. Beasly
B
A
Thos. Holcroft
W. Dearden

Peter Higson

Vincent Brooks, Day & Son, Lith

Hindley Green Colliery, Wigan.

This explosion took place in the Arley mine, a well known fiery seam, and caused the death of 62 persons. I arrived there on the day of the casualty, before the deceased were got out of the mine. I made many subsequent inspections of the same, and attended the coroner's inquest on the deceased, which was extended over six days. The verdict of the jury failed to fix responsibility: it was a sort of open verdict, aiming as it were at something beyond, which it omitted to express; but it condemned the practice of blasting the coal with gunpowder, which has since been discontinued. It manifestly happened within a few hundred yards of the downcast pit, and on the deep side of the horse road level, where the heat and flame left its marks on the roof and pillars of unworked coal unmistakeably. On the Rise, and in undoubtedly the worst ventilated districts of the mine, men who were working there came out uninjured, while on the other side of the pit the explosion was scarcely heard. The scene and origin of this disaster were to be easily traced to two slants which were being driven down hill by one of the deceased, Thomas Holcroft, a collier of no great ability, who seems to have had little or no experience in the use of gunpowder. He had worked in both these slants, and on the day of the explosion he was making a cut through from one to the other, and was working at the time in the lower one, at the point A on the plan, the other having been suspended for some time. Both were giving off gas rather freely, the top slant B. from the floor, face, and sides; the lower one at the face only; and the ventilation of both was at the time conducted for many yards by brattice. In the lower or bottom slant at A, I found a shot hole which had been charged, and the charge had been blown out, but the coal had not been disturbed. In the upper or top slant the sides and roof had been marked by fire, which could be traced more or less distinctly for a very considerable distance in the direction of the in-bye current of air, until at the place in which William Isherwood worked, at the point C., it appeared to have been most intense, and to have exploded there. At this point an empty powder can was found, in which gunpowder had no doubt been exploded. Some of the witnesses attributed the disaster to that cause, but subsequent inquiries brought out the facts that Isherwood could not have had so much as one pound weight of gunpowder in the can, and at most the can would not have held more than two pounds. As this cause seemed too ridiculous to be maintained, it died away in an echo. There can be little or no doubt that some gunpowder was ignited, but for the primary cause an accumulation of gas only could be assigned. After many a careful examination of the workings, I was obliged to return to the place first identified as that in which the gas had been accumulated, and where it was ignited, viz., in Thomas Holcroft's old place, or the top slant or end way shown on the plan hereunto annexed at B.; that place was giving off gas freely, and having been stopped for some time, gas would be accumulated if the brattice happened to be down, and from the traces of fire there it must have been so. When Thomas Holcroft fired the shot in the place below, it would, in consequence of not blowing down the coal, produce great flame, which would so expand as to reach and ignite the gas in the place above; and that being once ignited would go on burning so long as the air was inflammable, and on meeting with a supply of fresh air a little beyond Isherwood's place, it would as a natural consequence explode: that this been the course of events I have now no reason to doubt. The travelling flame of burning gas would in all probability ignite the gunpowder, and cause the death of some of the unfortunate men from actual burning, but the majority died from suffocation in the after-damp which was much stronger than any reasonable quantity of gunpowder could have produced, while the flame from the latter would not have extended a tenth part of the distance, as it had evidently travelled in this instance. The workings under consideration could not have been properly inspected that morning by the fireman, or, if they had, the gas must have been found by him. It could not have accumulated in the time that had elapsed between the hour of inspection and that of the explosion. It was on the day following the election for South-west Lancashire, on which the works were suspended, and a great deal of drinking going on in the neighbourhood, in which the fireman, John Highton, generally a sober man, joined. He returned home at eleven at night, quarrelled with his wife, and what he did after that hour is still only imperfectly known, but at the proper hour the following morning he was seen by the underlooker, and then reported to him that all the places were safe. A fair and reasonable quantity of air appeared to have been going through the workings generally, but this particular district could not have had any surplus quantity. When the workings were suspended a less quantity was capable of diluting the gas, but as they are finally stopped I have no means of testing it under other circumstances. All the care that could be taken by the manager, in the use of safety lamps, the employment of the underground officers, and the provision of materials, had been judiciously exer-

cised; but the mode of opening out the workings was of too bold a character to admit of my discovering that ordinary skill had been sagaciously applied in that department of the engineering of the works: still it was only a copy of the proceedings of some neighbouring mines, which has recently come into existence, but which cannot be too soon abandoned. These workings, which were only being opened out, have a range of strait work extending over 22 miles (see tracing of plan). Many of the deceased persons were found on the waggon road (see plan, D.), and in the openings on the south side below; only a few were burned, the rest were suffocated in the after-damp. The colliery had a good reputation among the workpeople for being well ventilated, and for the honest liberality of the firm, so that great sympathy was shewn them. This is another painful instance of the uncertainty of depending too much on ventilating by brattice cloth, instead of driving double roads, particularly in opening out mines, and of omitting to have places that have been stopped or suspended carefully examined daily. Much was written and talked about the barometer and the manner in which atmospheric changes affect the ventilation of mines and promote the escape of gas. In admitting the accuracy of such statements, I may here observe how ridiculous it seems to attribute the origin of explosions in mines to such causes, when there is sufficient evidence exhibited so plainly to prove the most gross neglect. The barometer was rising, and had been for two days, when this casualty happened.

Norley Colliery.

This explosion in the Orrell four-feet or Orley mine happened on the Monday following the pay day, when the general operations of the mines were suspended. Elijah Cheetham, fireman in charge of the workings in question, was ordered, being an idle day, to level the floor of the mine over a step in one Dauber's place, at A. on the plan, and was told at the time by the underlooker that the use of gunpowder would not be necessary, as it was soft. As Cheetham and his assistant went to their work, they had to pass by some men who were working near the eye of the pit, at B on. plan, from whom they obtained some gunpowder, which, contrary to instructions, they appear to have used. In a short time after they went in the explosion took place, which caused the death of eight persons, besides doing such injury to the workings, so that some time elapsed before I could complete my inspection of all the places. Subsequently I found that Cheetham had fired a shot, which appeared to have caused the explosion. It had left unmistakeable traces on the roof of the mine, and on the pillars of unworked coal, and it was proved by several trustworthy witnesses that the flame had actually entered the shaft 550 yards from the seat of the explosion. It was Cheetham's duty to have made a careful inspection of all the workings as soon as he got there, and more particularly on this than on ordinary occasions, as the furnace had been out, undergoing repairs, from the Saturday previous until the Sunday afternoon. If such inspection had been made, he must have found the gas which had evidently accumulated. About 14 persons only are employed generally in this district, and the quantity of air produced for the ventilation thereof may be taken at 6,000 cubic feet per minute. The mine gives off gas, but not very freely or in large quantity. Here again, as at the Wynnstay and Hindley Green Collieries, careful supervision was neglected.

Loss of life by Suffocation, at Nut Grove Colliery, St. Helens.

The manager, the surveyor, and one of the workmen of this colliery were suffocated in foul air while attempting to extinguish a fire in one of the thick mines of this colliery, which had become ignited by the cinders from a fire-grate in the upcast pit, which had been placed there to produce ventilation. It appeared that the heat had caused the upcast pit to collapse, so that the smoke and vapour arising from the fire, together with the carbonic acid gas of the mine, filled the bottom wagon road from the downcast pit. As far as I could ascertain, they were examining the stoppings which had been put in to keep it back, and to prevent the access of air to the fire. As this mistake is often made, it is necessary that I should again explain my views on the subject. When it becomes necessary to extinguish a fire below ground, the top of the pit or the entrance to the mine at the bottom should be hermetically closed, so that no air can reach the fire. A pipe to allow the escape of gas should be fixed in the stopping in the upcast pit. If that be properly done, the fire will go out, and the heat gradually cool down in a short time. The bottom of the upcast had not been regularly examined, and the pit was only used for the egress of the return air. It was lowered and raised by a windlass on the top.

PLAN

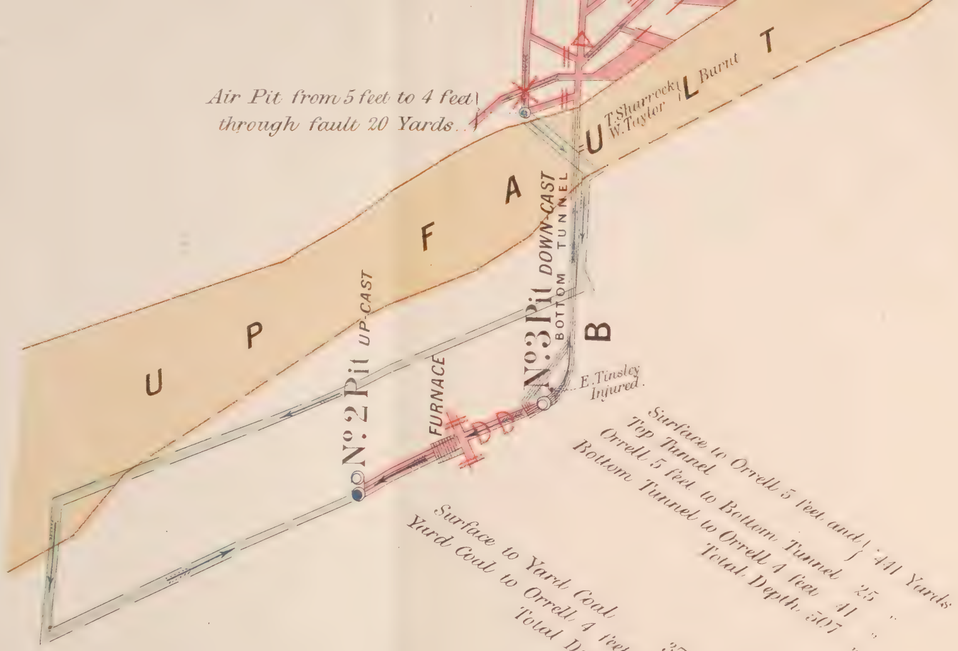
SHEWING THE WORKINGS IN THE BOTTOM TUNNEL

IN THE ORRELL FOUR FEET MINE

AT

NORLEY COLLIERY.

DECEMBER, 21ST 1868.


Air Pit from 5 feet to 4 feet through fault 20 Yards.
T. Sharrock
W. Taylor
Burnt
U P F A U L T
No. 2 Pit UP-CAST
No. 3 Pit DOWN-CAST
BOTTOM TUNNEL
FURNACE
E. Tinsley Injured.
B
Surface to Orrell 5 feet and Yard Coal 411 Yards
Top Tunnel to Orrell 5 Feet 25 "
Orrell 5 Feet to Bottom Tunnel 41 "
Bottom Tunnel to Orrell 4 feet 41 "
Total Depth 507 "
Surface to Yard Coal 377 Yards
Yard Coal to Orrell 4 feet 130 "
Total Depth 507 "

REFERENCE

The Orrell Four Feet Workings are colored thus
" Five " " " " "
" Direction of Air Current shewn thus .....

Scale 2 Chains to an Inch.

Vincent Broo

Falls of Roof.

Loss of life from falls of roof and falls of coal has been in the time under consideration far too great, but they may all be classed under two heads, of neglecting to prop and sprag, and that of pure accidents or misadventures. In the former, each individual was the sole guardian of his own safety. In the latter, further provisions seemed unnecessary, and unless men adopt greater care and thoughtfulness, such disasters will re-occur from time to time.

In Shafts.

Seventeen lives have been lost in shafts by falling into the same from the top and from mouthings part way down, by falling and being lowered into the sump, by falling out of the cage while going down and up, and by the cage falling upon them at the bottom of the pit. All these, with one exception, show an absence of ordinary care. In the exceptional case, two men descended the pit after working hours, unknown to the engine-man. The sump was uncovered for winding water, and they were lowered into it, and one of the two was drowned.

Loss of life from miscellaneous causes above and below ground.

Of the 19 persons killed below ground, and the 13 killed above ground, faint traces only in each case remained to assist me in investigating the cause thereof. No doubt, however, existed on my mind, that if the deceased persons had taken proper care of themselves those casualties would not have happened; they no sooner get accustomed to the work at one place than they leave it and go to another, so that they are continually leaving, and never acquire proficiency in their occupation. I find, as a rule, that accidents generally occur within a few days of their first beginning to work for a different employer.

It is satisfactory to find that, for the relief of the distress which these misfortunes have produced, a large sum of money has been given by the public. It would, however, be a source of comfort to the survivors of the deceased, and to those who get injured in the mines, if a permanent relief fund could be established on a good basis. Such a scheme has been seriously considered of late by some of the large employers of labour; and although it is still far from being fully matured, circumstances must ultimately render such aid to their deliberations as to bring them to a successful issue. The owners and workers of mines should co-operate, and contribute fair and reasonable proportions to the fund, out of which proper relief should be judiciously given.

As I had previously suspected the means provided for ventilating the workings in which the four great casualties of the year happened, the result shows that the boundary of inspection had been reached, that the ground beyond is extensive, and in many instances a waste and comparatively uncultivated tract, and that the time for its proper cultivation and enclosure has become an obvious necessity.

On the continent of Europe even females of tender age, and boys at the age of 10 years and upwards, are allowed to work in the mines, but competent persons only are permitted to take a part in the management of the works.

I have, &c.
(Signed) PETER HIGSON,
Inspector of Coal Mines.

The Right Hon. Henry Arthur Bruce, M.P.,
Secretary of State,
Whitehall, London."

List of the Fatal Colliery Accidents, and Loss of Life arising therefrom, in the South-west Lancashire and North Wales District, during the Year ending 31st December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.				
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.													
Jan. 3	1	Gidlow Lane	Wigan	Rylands and Cross	Peter Wood	Collier	—	Fall of roof	—	1	—	—	—
„ 6	2	Standish	Standish, Wigan	Wigan Coal and Iron Co.	John Heas	Drawer	14	Run over by a tub below ground	—	—	—	1	—
„ 14	3	Ewloe Hall	Buckley, Mold	Ewloe Hall Coal Co.	Wm. Anglesey	Filler	—	An explosion of gas	1	—	—	—	—
„ 15	4	Wern	Bagilt, Holywell	Wern Colliery Co.	Wm. Leighton	Labourer	15	Fall of roof	—	1	—	—	—
„ 18	5	Laffak	St. Helens	Messrs. Johnson	Jos. Taylor	Engine tenter	22	Falling into the pit from surface	—	—	1	—	—
„ 20	6	Brynn Moss	Wigan	Entwistle and Whittles	Saml. Thorpe	Ditto	18	Falling into the machinery	—	—	—	1	—
„ 21	7	Moor Pit	Aspull, Wigan	Wigan Coal and Iron Co.	Wm. Unsworth	Drawer	13	Fall of roof	—	1	—	—	—
„ „	8	Ladies Lane	Hindley, Wigan	Thos. Gldlow	Jno. Walmsley	Fireman	32	Ditto	—	1	—	—	—
„ 22	9	Hindley Hall	Ditto	Pearson and Knowles	Wm. Makinson	Collier	50	Ditto	—	1	—	—	—
„ „	„	Ditto	Ditto	Ditto	Jno. Wallwork	Prop drawer	46	Ditto	—	1	—	—	—
„ 27	10	Whiston	Near Prescot	Wigan & Whiston Coal Co.	Jno. Allerton	Bricksetter	—	Falling into shaft from the surface	—	—	1	—	—
„ „	11	Coleshill	Near Flint	Wm. Jones and Co.	—	Drawer	16	Falling under his tub	—	—	—	1	—
„ 31	12	Swan Lane	Hindley Green	Edwd. Johnson	J. Butterfield	Collier	19	Falling when part way down the shaft.	—	—	1	—	—
„ „	13	Plaskynaston	Ruabon	Plaskynaston Coal Co.	Thos. Williams	Ditto	35	Fall of coal	—	1	—	—	—
Feb. 4	14	Bromfield	Mold	Bromfield Coal Co.	Saml. Edwards	Ditto	—	An explosion	1	—	—	—	—
„ 6	15	Hafod	Wrexham	Ruabon Coal Co.	Jesse Williams	Ditto	30	Falling from part way down the shaft.	—	—	1	—	—
„ 7	16	High Brooks	Wigan	Mercer and Evans	Ime Doherty	Ditto	—	An exploded shot	1	—	—	—	—
„ „	17	Crow Orchard	Ormskirk	Crow Orchard Coal Co.	Richd. Smith	Engineman	59	Falling into the machinery	—	—	—	1	—
„ 8	18	Mostyn	Holywell	Mostyn Coal Co.	Jno. Lewis	Labourer	70	Run over by a locomotive above ground.	—	—	—	—	1
„ 10	19	Plaskynaston	Ruabon	Plaskynaston Coal Co.	Richd. Fleton	Collier	26	Fall of roof	—	1	—	—	—
„ 15	20	Ladies Lane	Hindley, Wigan	Thos. Gidlow	Geo. Wilson	Ditto	37	Ditto	—	1	—	—	—
„ 18	21	Laffak	St. Helens	Messrs. Johnson	Jos. Taylor	Engineman	—	Falling into the machinery	—	—	—	1	—
„ 19	22	Springs	Ince, Wigan	Pearson and Knowles	Jno. Ashurst	Brakesman	20	Run over by a coal truck above ground.	—	—	—	—	1
„ 22	23	Wynnstay	Ruabon	New British Iron Co.	Jno. Mills	Collier	28	Fall of roof	—	1	—	—	—
„ 23	24	Lea Green	St. Helens	Jno. Middlehurst	Michl. Burn	Banksman	—	Falling into pit from surface	—	—	1	—	—
								Carried over	3	10	5	5	2

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.				
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward -	3	10	5	5	2
Feb. 23	25	Ravenhead -	St. Helens -	Bromilow, Haydock, & Co.	Jno. Johnson -	Furnaceman	58	Falling out of the cage when ascending the pit.	–	–	1	–	–
„ 28	26	Brimilow Field	Wigan - -	Wigan Coal and Iron Co.	Jno. Fairhurst -	Collier -	20	Fall of roof in the yard mine -	–	1	–	–	–
Mar. 19	27	Pentre Saison -	Wrexham -	Pentre Saison Co. -	- - -	- - -	—	Run over on an inclined plane -	–	–	–	1	–
„ 20	28	Bromfield -	Mold - -	Bromfield Coal Co. -	Thos. Harris -	Hooker-on -	—	Falling into shaft from part way down.	–	–	1	–	–
„ „	29	Brimilow Field	Wigan - -	Wigan Coal and Iron Co.	Ewd. Draper -	Collier -	23	An explosion of gunpowder - -	1	–	–	–	–
„ 23	30	Englefield -	Holywell -	William Jones - -	Thos. Thomas -		—	Fall of roof - - - -	–	1	–	–	–
„ 25	31	Frood - -	Wrexham -	Sparrow and Pool -	Saml. Roberts -	Collier -	32	Ditto - - -	–	1	–	–	–
„ 29	32	St. Helens -	St. Helens -	Messrs. Pilkington -	Geo. Tarr - -	Furnaceman	68	Found dead in the sump - -	–	–	1	–	–
„ 30	33	Tryddyn -	Mold - -	Flintshire Oil Co. -	Rcd. Lewis -	Drawer -	—	Falling out of the cage while descending the pit.	–	–	1	–	–
April 20	34	The Mesnes -	Wigan - -	Charles Turner - -	- - -	- - -	—	Fall of roof - - -	–	1	–	–	–
„ „ „		Ditto - -	Ditto - -	Ditto - -	- - -	- - -	—	Ditto - - - -	–	1	–	–	–
„ „ „		Ditto - -	Ditto - -	Ditto - -	- - -	- - -	—	Ditto - - - -	–	1	–	–	–
„ 24	35	Green Slate -	Sherrington -	John Redshaw and Co. -	Rchd. Jolly -	Collier -	—	Ditto - - - -	–	1	–	–	–
May 15	36	Brimilow Field	Wigan - -	Wigan Coal and Iron Co.	Wm. Armstrong -	Ditto -	54	Ditto - - -	–	1	–	–	–
„ 16	37	Mostyn -	Holywell -	Mostyn Coal Co. -	Thos. Owen -	Labourer -	—	Ditto - - - -	–	1	–	–	–
„ 18	38	Rose Bridge -	Ince, Wigan -	J. G. Morriss - -	Thos. Anderton -	Ditto -	39	Fall of roof whilst drawing props -	–	1	–	–	–
„ 19	39	Chapel House -	Skelsmerdale -	Edwd. Smith - -	Wm. Gaskell -	Collier -	—	An explosion of gunpowder -	1	–	–	–	–
„ 24	40	Springs -	Hindley -	John Scowcroft and Co. -	Thos. Ellison -	Drawer -	—	A blown out shot - - -	1	–	–	–	–
„ „ „		Ditto - -	Ditto - -	Ditto -	Richd. Davies -	Collier -	21	Ditto - - -	1	–	–	–	–
„ 28	41	Brimilow Field	Wigan - -	Wigan Coal and Iron Co.	Edwd. Woodcock -	Labourer -	20	Run over by a locomotive above ground.	–	–	–	–	1
„ 30	42	Vron - -	Wrexham -	Maurice and Low -	Thos. Jones -	Collier -	62	Fall of roof - - -	–	1	–	–	–
June 2	43	Chapel House -	Ormskirk -	Thos. Firrimond - -	Thos. Young -	Ditto -	—	Fall of coal - - - -	–	1	–	–	–
„ „ „		Ditto - -	Ditto - -	Ditto - -	Mcl. Crolly -	Drawer -	—	Ditto - - -	–	1	–	–	–
								Carried over -	7	23	9	6	3

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.				
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward -	7	23	9	6	3
June 4	44	Black Park -	Chirk - -	John Stott Milne and Co.	John Swain -	- - -	43	An explosion of gas - -	1	–	–	–	–
„ „	45	Wynne Hall -	Ruabon -	Wynne Hall Coal Co. -	Thos. Evans -	Miner -	—	Fall of roof - - - -	–	1	–	–	–
„ 14	46	Pemberton -	Wigan - -	John Blundell and Sons -	Thos. Tuberer -	Fireman -	45	Ditto - - -	–	1	–	–	–
„ 14	47	Kirkless -	Ditto - -	Wigan Coal and Iron Co.	Jno. Baxendale -	Collier -	—	A blown-out shot - - -	1	–	–	–	–
„ 15	48	Pewfall -	St. Helens -	Richd. Evans and Son -	Wm. Prior -	Ditto -	—	Fall of coal - - -	–	1	–	–	–
„ „	49		Wigan - -	Wigan Coal and Iron Co.	Jas. Smith -	- - -	—	Fall of roof - - - -	–	1	–	–	–
„ 26	50	Blackley Hurst	St. Helens -	Samuel Stock - -	James Low -	Banksman -	63	Being caught on the arm by the descending cage.	–	–	1	–	–
July 1	51	Aston Hall -	Hawarden, Mold	Aston Hall Colliery Co. -	John Evans -	Labourer -	16	Breaking of a jig chain in the mine	–	–	–	1	–
„ 6	52	Rose Bridge -	Ince, Wigan -	J. G. Morris - -	John Rudd -	Ditto -	41	A railway truck supported by props falling upon him.	–	–	–	–	1
„ 7	53	Mostyn -	Holywell -	Mostyn Coal Co. - -	Thos. Jones -	Collier -	—	Fall of roof - - -	–	1	–	–	–
„ 11	54	Queen's Ferry -	Chester - -	Messrs. Thompson -	Jos. Newton -	Ditto -	—	Fall of coal - - - -	–	1	–	–	–
„ 19	55	Rainford -	St. Helens -	Rainford Coal Co. -	Thos. Short -	Ditto -	41	Ditto - - -	–	1	–	–	–
„ 23	56	Brinks - -	Haigh, Wigan -	Wigan Coal and Iron Co.	Chas. Collier -	Ditto -	20	Fall of roof - - - -	–	1	–	–	–
„ 25	57	Pemberton -	Wigan - -	John Blundell and Son -	Chas. Lane -	Hooker-on	14	Struck by the descending cage at the eye of the pit.	–	–	1	–	–
„ 31	58	Moor Pit -	Aspull, Wigan -	Wigan Coal and Iron Co.	Chas. Gray -	Labourer -	—	A tub having been run against him in the mine.	–	–	–	1	–
Aug. 3	59	Vron - -	Wrexham -	Maurice and Low -	Evan Thomas -	Ditto -	—	Injuries received above ground -	–	–	–	–	1
„ 5	60	Parr - -	St. Helens -	Richd. Evans and Sons -	Jas. Potter -	Drawer -	17	Drowned in the sump - -	–	–	–	1	–
„ 9	61	Little Mountain	Buckley, Mold -	Little Mountain Colliery Co.	Jno. Rowland -	Collier -	—	Fall of roof - - - -	–	1	–	–	–
„ 10	62	Norley -	Wigan - -	Norley Colliery Co. -	Jno. Edwards -	Ditto -	—	Fall of coal - - -	–	1	–	–	–
„ „	63	Pemberton -	Ditto - -	Jno. Blundell and Sons -	Wm. Cadman -	Wagoner -	—	Being run over by coal truck above ground.	–	–	–	–	1
„ 12	64	Bronwhlfa -	Mold - -	Whilfa Colliery Co. -	Robt. Roberts -	Collier -	—	Fall of roof - - -	–	1	–	–	–
„ „	65	Peasley Cross -	St. Helens -	Bournes and Co. - -	Rhd. Cottam -	Ditto -	36	Struck by a tub on an inelined plane	–	–	–	1	–
„ 17	66	Brynn Moss -	Wigan - -	Entwistle and Whittles -	Rchd. Johnson -	Engineman	56	Falling into the machinery - -	–	–	–	1	–
„ „	67	Swan Lane -	Ditto - -	Edward Johnson - -	Chas. Abbott -	Jigger -	35	An explosion - - -	1	–	–	–	–
								Carried over -	10	34	11	11	6

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.				
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward -	10	34	11	11	6
Aug. 17	67	Swan Lane -	Wigan - -	Edward Johnson - -	John Reeves -	Collier -	30	An explosion - - -	1	–	–	–	–
„ „	„	Ditto -	Ditto - -	Ditto - -	Jos. Phinee -	Fireman -	35	Ditto - - -	1	–	–	–	–
„ 20	68	Pewfall -	St. Helens -	Richard Evans and Sons -	Jos. Travis -	Collier -	35	Fall of roof - - -	–	1	–	–	–
„ 14	69	Rose Bridge -	Wigan - -	J. G. Morris - -	Jas McMain -	Ditto -	22	Ditto - - -	–	1	–	–	–
Sept. 1	70	Plaskynaston -	Ruabon - -	Plaskynaston Coal Co. -	Wm. Thomas -	Ditto -	26	Ditto - - -	–	1	–	–	–
„ „	71	Brymbo -	Wrexham -	The Brymbo Colliery Co.	Thos. Reynolds -	Drawer -	12	Struck by the descending cage in the eye of the pit.	–	–	–	1	–
„ 4	72	Kirkless Hall -	Wigan - -	Wigan Coal and Iron Co.	Jno. Hughes -	Collier -	22	Fall of roof - - -	–	1	–	–	–
„ 7	73	Ruabon -	Ruabon - -	Ruabon Coal and Coke Co.	Jno. Evans -	Sinker -	—	An explosion in a sinking pit -	1	–	–	–	–
„ 8	74	Moor Pit -	Aspull, Wigan -	Wigan Coal and Iron Co.	Rd. Lathom -	Collier -	—	Fall of roof - - -	–	1	–	–	–
„ 10	75	Flint Marsh -	Flint - -	Jno. Ormeston and Co. -	Robt. Jones -	Ditto -	—	Ditto - - -	–	1	–	–	–
„ 12	76	Springs -	Wigan - -	Pearson and Knowles -	H. McDonald -	Ditto -	32	Ditto - - -	–	1	–	–	–
„ 15	77	Black Park -	Chirk - -	Jno. Stott Milne and Co. -	Robt. Owen -	Ditto -	36	Ditto - - -	–	1	–	–	–
„ 16	78	Mostyn -	Holywell -	Mostyn Coal Co. - -	Jos. Richards -	Ditto -	19	Fall of coal - - -	–	1	–	–	–
„ 17	79	California -	Aspull, Wigan -	Wigan Coal and Iron Co.	Jno. Ainscough -	Ditto -	39	Fall of roof - - -	–	1	–	–	–
„ 18	80	Fir Tree House	Ince, Wigan -	Crompton and Shawcross -	- - -	- - -	—	Run over by a tub below ground -	–	–	–	1	–
„ 24	81	Pewfall -	St. Helens -	Richd. Evans and Sons -	Thos. McDonald -	Labourer -	—	Ditto ditto -	–	–	–	1	–
„ 26	82	Ince Springs -	Wigan - -	Pearson and Knowles -	Thos. Clayton -	Collier -	—	Fall of roof - - -	–	1	–	–	–
„ 30	83	Vron - -	Wrexham -	Maurice and Low -	D. Humphries -	Ditto -	44	Falling out of cage while ascending the pit.	–	–	1	–	–
„ „	84	Wynnstay -	Ruabon -	New British Iron Co. -	- - -	- - -	—	An explosion; 10 persons killed, and 13 injured.	10	–	–	–	–
Oct. 5	85	Ince Hall -	Ince, Wigan -	Ince Hall Coal and Cannel Co.	Jno. Dermont -	Collier -	16	Fall of roof in the Cannel mine -	–	1	–	–	–
„ 6	86	Cae Pen-ty -	Frood, Wrexham	Thos. Roberts and Co. -	Abbr. Gabbott -	Drawer -	41	Fall of coal from the sides of main coal.	–	1	–	–	–
„ 9	87	Ladies Lane -	Hindley, Wigan	Thos. Gidlow - -	Jos. Parkinson -	Collier -	45	Fall of coal in the Arley mine -	–	1	–	–	–
„ 10	88	Lindsay Pit -	Haigh - -	Wigan Coal and Iron Co.	Thos. Forshaw -	Door tenter	13	Crushed by boxes in the Arley mine	–	–	–	1	–
								Carried over -	23	48	12	15	6

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.				
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.
								Brought forward -	23	48	12	15	6
1868.													
Oct. 12	89	Frood -	Wrexham -	Sparrow and Poole -	Wm. Roberts -	Drawer -	—	An explosion of firedamp (yard coal)	1	–	–	–	–
„ 14	90	Ditto -	Ditto - -	Ditto - -	Jno. Grey -	Ditto -	—	Fall of roof in the main coal -	–	1	–	–	–
„ 15	91	Edge Green -	Golborne -	Richd. Evans and Sons -	W. Twiss -	Daitler -	21	Fall of roof in the Wigan 4-ft. mine	–	1	–	–	–
„ 16	92	Upholland -	Wigan - -	Dillon Brook Coal Co. -	Thos. Rigby -	Sinker -	52	A drill falling upon him out of the tub while it was being lowered from the top.	–	–	1	–	–
„ „	93	Westminster -	Wrexham -	Westminster Coal Co. -	Wm. Edwards -	Chartermaster	39	Fall of roof in the main coal mine -	–	1	–	–	–
„ 20	94	Parr - -	St. Helens -	Richd. Evans and Sons -	Jno. Chorley -	Collier -	44	Falling out of cage while ascending	–	–	1	–	–
„ 21	95	Rose Bridge -	Ince, Wigan -	J. G. Morris - -	Wm. Rowson -	Ditto -	54	Fall of roof in the Cannel mine -	–	1	–	–	–
„ 23	96	Pentre Saisons	Minera, Wrexham	Pentre Saison Coal Co. -	Jno. Owens -	Ditto -	—	Fall of roof - - -	–	1	–	–	–
„ 24	97	Vron - -	Wrexham -	Maurice and Low -	Jno. Rogers -	Drawer -	15	Falling into shaft from a mouthing -	–	–	1	–	–
„ 26	98	Waterloo -	Ruabon -	Plaskynaston Coal Co. -	Saml. Lloyd -	Stranger -	10	Caught in a revolving chain -	–	–	–	–	1
„ 29	99	Kirkless -	Wigan - -	Wigan Coal and Iron Co.	Frank Murphy -	Labourer -	65	Run over by a locomotive above ground.	–	–	–	–	1
„ 31	100	Waterloo -	Ruabon -	Plaskynas Coal Co. -	Jno. Turner -	Collier -	42	Fall of roof - - -	–	1	–	–	–
Nov. 2	101	California -	Aspull, Wigan -	Wigan Coal and Iron Co. -	Hugh Hayes -	Labourer -	65	Run over by coal trucks on branch railway.	–	–	–	–	1
„ „	102	Nut Grove -	St. Helens -	James Radley - -	Wm. Naylor -	Underlooker	54	Suffocation in noxious vapour produced by the mine being on fire - - - - -	1	–	–	–	–
„ „	„	Ditto -	Ditto - -	Ditto - -	Jno. Campbell -	Surveyor -	21		1	–	–	–	–
„ „	„	Ditto - -	Ditto - -	Ditto - -	Wm. Foster -	Wagoner -	42		1	–	–	–	–
„ 4	103	Upholland -	Wigan - -	Wigan Coal and Iron Co.	Jno. Pennington -	Jigger -	14	Deceased was in front of a full tub on the top of a self-acting plane when the chain broke.	–	–	–	1	–
„ 5	104	Ince Hall -	Ditto - -	Ince Hall Coal and Cannel Co.	Peter Conway -	Drawer -	25	Crushed by a tub, and seriously injured.	–	–	–	1	–
„ 11	105	Hanmer -	Mostyn, Holywell	Eyton and Elliot -	Joshua Price -	Collier -	28	Fall of coal - - -	–	1	–	–	–
„ „	„	Low Hall -	Wigan - -	Moss Hall Coal Co. -	- - -	- - -	—	Run over by railway truck on surface.	–	–	–	–	–
„ 18	106	Bronwhlfa -	Mold - -	Bromwhylfa Coal Co. -	Geo. Mathews -	- - -	—	Fall of roof - - - -	–	1	–	–	–
								Carried over -	27	56	15	17	9

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.				
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward -	27	56	15	17	9
Nov. 18	107	Low Hall -	Wigan - -	Moss Hall Coal Co. -	M. Gerrar -	Wagoner -	12	Fell off buffer and was run over above ground.	–	–	–	–	1
„ 25	108	Little Mountain	Buckley, Mold -	Little Mountain Coal Co.	Ste. Ashton -	Collier -	40	Fall of coal - - - -	–	1	–	–	–
„ 24	109	Black Park -	Chirk - -	John Stott Milne and Co.	Jos. Hunter -	Underlooker	28	Run over by a train of tubs at the foot of an engine plane.	–	–	–	1	–
„ 25	110	Hindley Green	Hindley, Wigan	John Scowcroft and Co. -	- - -	- - -	—	An explosion of fire-damp - -	62	–	–	–	–
„ 28	111	Crank - -	Rainford - -	Crank Coal Co. - -	Jas. Roughley -	Banksman -	46	Lowered into the sump - -	–	–	1	–	–
Dec. 1	112	Swan Lane -	Hindley, Wigan -	Edward Johnson -	Wm. Davenport -	Collier -	45	Fall of roof - - - -	–	1	–	–	–
„ 9	113	Ince Hall -	Ince, Wigan -	Ince Hall Coal, &c. Co -	A. O'Connell -	Ditto -	21	Ditto - - - -	–	1	–	–	–
„ 10	114	Ladies Lane -	Hindley, Wigan -	Thos. Gidlow - -	Geo. Pendlebury -	Banksman -	45	Falling into pit from surface -	–	–	1	–	–
„ 9	115	Wynn Hall -	Ruabon -	Wynn Hall Coal Co. -	Robt. Roberts -	Collier -	—	An explosion of fire-damp - -	1	–	–	–	–
„ 12	116	Haydock -	St. Helens -	Richd. Evans & Sons	J. Leatherbarrow -	Ditto -	27	Fall of roof - - - -	–	1	–	–	–
„ 13	117	California -	Aspull, Wigan -	Wigan Coal and Iron Co. -	Jas. Leigh -	Ditto -	43	Ditto - - - -	–	1	–	–	–
„ 17	118	Springs -	Ince, Wigan -	Pearson and Knowles -	Thos. Caran -	Hooker-on	—	Struck by descending cage -	–	–	1	–	–
„ 18	119	Vron - -	Wrexham -	Maurice and Low -	Jno. Williams -	Wagoner -	—	Run over by a loaded wagon below ground.	–	–	–	1	–
„ 19	120	Flint Marsh -	Flint - -	Jno. Ormiston and Co. -	Robt. Ellis -	Collier -	—	An explosion - - - -	1	–	–	–	–
„ 21	121	Lindsay Pit -	Haigh, Wigan -	Wigan Coal and Iron Co.	Patk. Regan -	Ditto -	22	Fall of roof - - - -	–	1	–	–	–
„ „	122	Norley -	Wigan - -	The Norley Colliery Co. -	- - -	- - -	—	An explosion of fire-damp - -	8	–	–	–	–
„ 22	123	Brynn Hall -	Ditto -	W. and J. Crippin -	Jas. Cummin -	Labourer -	26	Crushed between railway trucks -	–	–	–	–	1
„ „	124	Aspull -	Ditto -	Wigan Coal and Iron Co.	Hy. Hackett -	Coke burner	—	Run over by a locomotive above ground.	–	–	–	–	1
„ „	125	Blackleyhurst -	St. Helens -	Saml. Stock - -	Lydia Roby -	Labourer -	17	Coal cleaner - - -	–	–	–	–	1
„ 26	126	Haydock -	Ditto -	Richd. Evans and Sons -	- - -	- - -	—	An explosion - - -	26	–	–	–	–
								Total -	125	62	18	19	13

SUMMARY of the FATAL COLLIERY ACCIDENTS, and LOSS of LIFE arising therefrom, in the SOUTH-WEST LANCASHIRE and NORTH WALES DISTRICT, during the Year ending 31st December 1868.

No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Number of Lives lost.					
				Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
20	Haigh, Aspull, Kirkless, Holland, and Standish.	Wigan	Wigan Coal and Iron Co.	2	10	–	4	4	20
1	Ewloe Hall	Buckley	Ewloe Hall Co.	1	–	–	–	–	1
1	Wern	Bagilt	Wern Colliery	–	1	–	–	–	1
2	Brynn Moss	Wigan	Entwistle and Whittles	–	–	–	2	–	2
2	Laffax Lane	Ditto	Messrs. Johnson	–	–	1	1	–	2
4	Ladies Lane	Ditto	Thos. Gidlow	–	3	1	–	–	4
5	Hindley Hall, Springs and Moss.	Ditto	Pearson and Knowles	–	4	1	–	1	6
1	Whiston	Prescott	Wigan and Whiston Co.	–	–	1	–	–	1
2	Englefield	Holywell	Wm. Jones and Co.	–	1	–	1	–	2
3	Swan Lane	Wigan	E. Johnson	3	1	1	–	–	5
5	Plaskynaston	Ruabon	Plaskynaston Coal Co.	–	4	–	–	1	5
2	Bromfield	Mold	Bromfield Coal Co.	1	–	1	–	–	2
2	Ruabon	Ruabon	Ruabon Coal Co.	1	–	1	–	–	2
1	Park Lane	Wigan	Mercer and Evans	1	–	–	–	–	1
1	Crow Orchard	Ormskirk	Crow Orchard Coal Co.	–	–	–	1	–	1
4	Mostyn	Holywell	Mostyn Coal Co.	–	3	–	–	1	4
2	Wynnstay	Ruabon	New British Iron Co.	10	1	–	–	–	11
1	Sutton	St. Helen's	Jno. Middlehurst	–	–	1	–	–	1
1	Ravenhead	Ditto	Bromilow, Haydock, & Co.	–	–	1	–	–	1
2	Pentresaison	Wrexham	Pentresaison Co.	–	1	–	1	–	2
3	Frood	Ditto	Sparrow and Pool	1	2	–	–	–	3
1	St. Helen's	St. Helen's	Messrs. Pilkington	–	–	1	–	–	1
1	Leeswood Hill	Mold	Flintshire Oil Co.	–	–	1	–	–	1
1	The Mesnes	Wigan	Chas. Turner	–	3	–	–	–	3
1	Green Slate	Ditto	Jno. Redshaw and Co.	–	1	–	–	–	1
4	Douglas Bank	Ditto	J. G. Morris	–	3	–	–	1	4
1	Chapel House	Ormskirk	Ed. Smith	1	–	–	–	–	1
2	Hindley Green	Wigan	Jno. Scowcroft and Co.	64	–	–	–	–	64
5	Vron	Wrexham	Morris and Low	–	1	2	1	1	5
1	Chapel House	Ormskirk	Thos. Farrimond	–	2	–	–	–	2
3	Black Park	Chirk	J. S. Milne and Co.	1	1	–	1	–	3
2	Wynn Hall	Ruabon	Wynn Hall Coal Co.	1	1	–	–	–	2
3	Pemberton	Wigan	Jno. Blundell and Son	–	1	1	–	1	3
8	Haydock and Edge Green.	St. Helen's	Richd. Evans and Sons	26	4	1	2	–	33
1	Aston Hall	Hawarden	Aston Hall Colliery Co.	–	–	–	1	–	1
2	Blackley Hurst	St. Helen's	Saml. Stock	–	–	1	–	1	2
1	–	–	Messrs. Thompson	–	1	–	–	–	1
1	Rainford	St. Helen's	Rainford Coal Co.	–	1	–	–	–	1
2	Little Mountain	Buckley	Little Mountain Coal Co.	–	2	–	–	–	2
2	Norley	Wigan	Norley Colliery Co.	8	1	–	–	–	9
1	Bronwhilfa	Mold	Whilfa Colliery Co.	–	1	–	–	–	1
1	Peasley Cross	St. Helen's	Bournes and Co.	–	–	–	1	–	1
1	Brymbo	Wrexham	Brymbo Colliery Co.	–	–	–	1	–	1
2	Flint Marsh	Flint	Jno. Ormeston and Co.	1	1	–	–	–	2
1	Old Ince Hall	Wigan	Crompton and Shawcross	–	–	–	1	–	1
3	Ince Hall	Ditto	Ince Hall Coal Co.	–	2	–	1	–	3
1	–	–	Thos. Roberts and Co.	–	1	–	–	–	1
1	Upholland	Wigan	Dillon Brook Coal Co.	–	–	1	–	–	1
1	Westminster	Wrexham	Westminster Coal Co.	–	1	–	–	–	1
1	Nut Grove	St. Helen's	Jas. Radley	3	–	–	–	–	3
1	Hanmer	Holywell	Eyton and Elliott	–	1	–	–	–	1
1	Moss Hall	Wigan	Moss Hall Coal Co.	–	–	–	–	1	1
1	Bromwhilfa	Mold	Bromwhilfa Coal Co.	–	1	–	–	–	1
1	Crank	St. Helen's	Crank Colliery Co.	–	–	1	–	–	1
1	Brynn Hall	Wigan	W. and J. Crippin	–	–	–	–	1	1
1	Gidlow Lane	Ditto	Rylands and Cross	–	1	–	–	–	1
126			Total	125	62	18	19	13	237

Mr. Evans' Report.

REPORT on the INSPECTION of COAL MINES, and the MINES of IRONSTONE of the COAL MEASURES worked in connexion with COAL, &c., in the MIDLAND DISTRICT, for the Year ended 31st December 1868.—By THOMAS EVANS, Esq., F.G.S.

SIR, Field Head House, Belper, 1st March 1869.

I have the honour to transmit for your consideration this my Thirteenth Annual Report on the working of the several Acts of Parliament for the regulation and inspection of mines; and for the fourth time on the Midland District, comprising the counties of Derby, Nottingham, Leicester, and Warwickshire.

It is satisfactory to be able to report that although there is a small increase in the total quantity of coal raised, the number of lives lost from accidents in or about the collieries of the district is less than the preceding year. The quantity of coal worked in the year 1867 was (7,600,000) seven million six hundred thousand tons, lives lost (64) sixty-four, or one death to every (118,750) one hundred and eighteen thousand seven hundred and fifty tons; whereas in the year 1868, coal worked (7,699,000) seven million six hundred and ninety-nine thousand tons, lives lost (60) sixty, or one death to (128,317) one hundred and twenty-eight thousand three hundred and seventeen tons.

It will be seen on reference to the General Statistics accompanying the Reports of the Inspectors of Mines, that in Great Britain the quantity of coal worked in the past year (1868) is one hundred and four millions six hundred thousand tons, the total deaths one thousand and eleven, or one life lost to every one hundred and three thousand four hundred and sixty tons.

The Midland District compares most favourably with the rest of Great Britain.

Five separate accidents have been reported this year as having happened in the ironstone mines of the coal measures, attended with the loss of five lives. I again repeat that I do not place full confidence in this return, for it is difficult, indeed almost impossible, to determine what constitutes an ironstone mine worked in connexion with coal, or with any disused or exhausted coal mine. It is contended by some that coal worked with the ironstone must be of commercial value, whereas by others it is thought any coal, irrespective of its value, (thickness, quality, &c.,) if worked together with the ironstone, comes within the meaning and provisions of the Act of Parliament (23 & 24 Vict., cap. 151.) Now it appears to me that persons employed underground in the mines of ironstone are liable to precisely similar accidents in character to coal miners, and as the law was made and is intended for the protection and safety of the workmen, it would in my opinion be most desirable in any future legislation on the subject to include all ironstone mines worked underground in the law for the inspection and regulation of mines.

TABLE No. 1.

TABLE showing the Number of Deaths, the Coal raised, and the Number of Tons of Coal raised for each Death during the 13 years ended 31st December 1868.

Dates.	Explosions of Gas.	Inundation of Water.	Falls of Coal.	In Shafts.	Crushed by Tubs, and Miscellaneous Accidents.	Total.	Tons of Coal raised.	Tons of Coal raised for each Death.
1856	3	—	21	16	6	45	4,500,000	97,000
1857	15	—	14	6	20	55	4,750,000	86,000
1858	—	—	16	16	10	42	5,060,000	121,000
1859	2	—	18	13	7	40	5,460,000	134,000
1860	3	—	21	13	13	50	6,215,000	124,000
1861	3	23	21	15	7	69	6,503,319	94,000
1862	2	—	25	4	12	43	6,647,000	154,000
1863	4	5	26	9	8	52	7,000,000	134,000
1864	11	—	30	9	16	66	7,300,000	110,000
1865	9	—	36	13	24	82	7,575,000	92,383
1866	7	—	26	6	19	58	7,600,000	131,034
1867	4	—	25	11	19	64	7,600,000	118,750
1868	1	—	24	9	26	60	7,699,000	128,317

TABLE No. 2.

SUMMARY of separate Colliery Accidents in the Midland District during the years 1867 and 1868.

	1867.	1868.
Explosions of fire-damp	2	1
Falls of roof	25	24
Shaft	11	9
Miscellaneous	21	24
Total accidents	59	58

SUMMARY OF LIVES LOST IN THE ACCIDENTS.

Explosions of fire-damp	4	1
Falls of roof	25	24
Shafts	11	9
Miscellaneous	24	26
Total deaths	64	60

Shaft Accidents.

Falling from part way down	1	5
Things falling from surface	2	—
„ „ „ part way down	1	1
Ropes and chains breaking	—	1
Whilst ascending and descending	5	1
Explosion of powder	—	1
Overwinding	1	—
Suffocated in sinking shaft	1	—
Total	11	9

Miscellaneous.

Explosions of gunpowder	5	8
Suffocation by gases	1	2
On incline planes	2	7
By trams and tubs	12	5
Boilers bursting	3	—
On surface, machinery	1	1
„ „ run over	—	3
Total	24	26

TABLE No. 3.

SHOWING the Number of Male Coal Miners employed in and about the Coal Mines of the Midland District, Lives lost, and Tons of Coal raised per Life lost.

	Persons employed.	Deaths.	Coal raised.	Tons of Coal raised per Life lost.
Derbyshire	16,240	33	4,957,879	150,239
Nottingham	5,719	11	1,508,439	137,131
Leicester	3,019	8	608,088	76,011
Warwick	3,022	8	624,859	78,107
Total	28,000	60	7,699,265	128,321

The death rate in proportion to the persons employed, and the coal raised, is much greater in the smaller coal districts of Leicester, and Warwick, than in those of the Counties of Derby, and Nottinghamshire. In Leicestershire the mines are of great thickness, and in many cases the roofs are dangerous, requiring great attention and care.

In Warwickshire the mines are also thick, the inclination towards the west is from 15 to 20 inches in the yard, with often a tender roof.

Large quantities of Clay Ironstone are worked in Warwickshire and taken into South Staffordshire to be smelted; there being no blast furnaces in the county, the coal is not suitable for iron-making purposes.

TABLE No. 4.

LIST of COLLIERIES where Accidents have taken place in the years 1865, 1866, 1867, and 1868.

Name of Colliery.	Owner's Name.	Total Deaths in 4 years.
Clay Cross	William Jackson & Co.	31
Butterley Coal and Iron Company	Wright & Jessop	28
Staveley	Staveley Coal and Iron Company, Limited	25
Cinder Hill, Newcastle and Babington	Executors of Thomas North	11
High Park, Watnall, Eastwood, Cotmanhay, Hill Top, Langly, &c.	Barber, Walker & Co.	11
Swannington, Coleorton, &c.	Walker and Worswick	10
Bretby	The Earl of Chesterfield	7
Swadlincote, Cadley Hill	Hall and Boardman	6
Snibston	G. Stevenson & Co.	6
Stanton	Nadin & Co.	6
Nesfield, Sheepbridge, &c.	Sheepbridge Iron Company, Limited	6
Hawkesbury	J. Darlington & Co.	6
Victoria	— Troughton	5
Birley Vale	Jeffcock and Dunn	5
Moira, Church Gresley, Oakthorpe	Executors of Marquis of Hastings	5
Glascote	Firmstone & Co.	4
Riddings, Selston, &c.	James Oakes & Co.	4
Shirland	H. Baillie	4
Gresley Wood	Gresley Wood Company, Limited	4
Shipley	A. M. Mundy	4
Swanwick	Moorewood	4
Renishaw Park, &c.	J. and G. Wells	4
Oakerthorpe, Highfield, &c.	Oakerthorpe Iron Company, Limited	3
Nailstone	J. Ellis	3
Kettlebrooke	Executors of Dumulo	3
Wingerworth	Wingerworth Coal Company	3
Denby	G. and W. H. Dawes	2
Shireoaks	Shireoaks Colliery Company, Limited	2
Unston	Rangeley	2
Pinxton	Coke & Co.	2
Haunch Wood	Nowell & Son	2
Whitwick	Executors of J. Whetston	2
Ibstock	Executors of J. Whetston	2
Denby	W. D. Lowe	2
Hucknall Torkard	E. Ellis & Co.	2
Birchwood	C. Seeley & Co.	2
Digby	Hall & Co.	2
Tibshelf	J. Chambers	2
Tame Valley	Nock Brothers	1
Bridgehouse	J. Sayer	1
Kilburne	J. Rae	1
Stoneyford	J. Wooley	1
Danesmoore	Smith and Shepherd	1
Charity	Addenbrook and Pidcock	1
Grassmoore	Barnes	1
Pooley Hall	Limited Liability Company	1
Bagworth	Executors of Viscount Maynard	1
Boythorpe	Wingerworth Coal Company	1
Baddesley	W. S. Dugdale	1
Giltbrook	Hicks and Whittaker and Co.	1
Devonshire	Devonshire Silkstone Company	1
Rutland	Executors of Potter	1
West Hallam	F. Newdegate	1
Renishaw	Appleby	1
Hill Top	C. Booth	1

Name of Colliery.	Owner's Name.	Total Deaths in 4 years.
Brampton	Limited Company	1
Molyneux	Eastwood and Swingler	1
Tapton	Tapton Coal Company, Limited	1
Polesworth	Harris and Shaw	1
Sutton	Executors of Richard Arkwright	1
West Staveley	William Bainbridge & Co.	1
Annesley	William Worswick	1
Tapton	Tapton Company	1
Blackwall	E. Chambers	1
Granville	Executors of Court Grenville	1
Wilnecote	Perrins and Harris	1
Nuneaton New Colliery	Limited Company	1
Newbold	C. H. Plevins	1
Alma	Limited Company	1
Skegby	Skegby Coal Company	1
	Total	264

Lives lost in 4 years.	Coal raised.	Coal raised for each Death.
264	30,474,000	115,053

losions
is.

Only one fatal accident from "explosion of gas" has taken place during the year, one life was lost thereby; and this with ordinary care might have been prevented.

It occurred on the eighteenth of May at the Cinderhill Colliery, belonging to the trustees of the late Thomas North, it is one of the most extensive in the county of Nottinghamshire.

I made an examination of the workings soon after the explosion. It appeared a little gas lodged in the roof of the mine in consequence of a partial stoppage of the air. The deputy knew of the presence of gas in this place, and had given directions to open out the air-way, and thus restore the ventilation; he had however neglected to see, *himself*, that the persons employed at this work were supplied with safety lamps "properly locked, and examined," but allowed the deceased to have a naked light within a few yards of the gas; and at this exposed light the explosion took place, and killed a collier named William Hardy. I have had reason on previous occasions to complain of the general management, ventilation, and supervision of this colliery; it is only fair, however, to state the present owners, and agents, are doing all in their power to make matters safe, and I doubt not that Cinderhill, and the other collieries, belonging to these gentlemen will be again in as good a condition as they used to be in years gone by.

s of roof.

The average "loss of life" from "falls of roof" and "sides of working places," for the past ten years, is twenty-five, or one in excess of the present year. I still think, indeed I know, that some of these are preventable, not without watchfulness, and care, on the part of the colliers, strict supervision on the part of those in authority, and punishment for disobedience to the special rules, which have been framed and made law solely for the protection and security of the collier himself.

I seldom go into a colliery without having to point out places left insufficiently supported, especially in "holeing" under the coal, even although the law distinctly directs that short "sprags" or props, must be set every two yards, before the "holers" commence to undermine the coal. It will be readily seen that much depends on the man himself, whether his place is safe, or unsafe, and if he will persist in the careless neglect of such important duties as I have described, accidents, and deaths will certainly go on increasing.

It is worthy of remark, and deserves the earnest attention and consideration of all engaged in the management of mines, that in Great Britain the loss of life

From Falls of Coal in 1868, is 445, Explosions of Gas, 154.
„ „ 1867 „ 449, „ „ 286.

The horrors attending an explosion of gas are soon heard of far and near, they awaken public sympathy, and the awfully sudden loss of so many lives is immediately brought before their notice, when handsome sums of money are given for the bodily relief of the widows, and children.

Deaths from falls of roof amount in the aggregate to nearly double the number by explosions, they occur singly, the public know nothing of them; the individual privation and suffering is often keenly felt by those who are left without their protector, nearly always their only support.

I must, however, not omit to state that at some of the large works benefit clubs have been established for the relief of the sick, or injured, and some assistance in case of death from accident. The owners give an annual subscription, and the men pay weekly a fixed sum, and the management is left to a Committee elected by the men; these societies have been found to work well, and do good service in times of need.

Deaths from Falls of Roof have taken place at the under-mentioned Collieries during the years 1867 and 1868.

Name of Colliery.	Owner's Name.	Deaths.	
		1867.	1868.
Butterley	Butterley Iron and Coal Company	6	1
Staveley	Staveley Coal and Iron Company	3	3
Clay Cross	William Jackson & Co.	3	3
High Park, Eastwood, &c.	Barber, Walker, & Co.	—	3
Sheepbridge, &c.	Sheepbridge Company, Limited	—	3
Swannington, &c.	Walker and Worswick	—	3
Stanhope	E. Nadin & Co.	2	—
Nailstone	J. Ellis & Co.	2	—
Cinderhill, &c.	Exors. of Thomas North	2	—
Glascote	Firmstone	1	—
Molyneux	Eastwood and Swingler	1	—
Pinxton	Coke & Co.	1	—
Haunch Wood	Nowell & Son	1	—
Shirland	H. Baillie	1	—
Swadlincote	Hall and Boardman	1	—
Hill Top	C. Booth	1	—
Hucknall Torkard	E. Ellis & Co.	—	1
Whitwick	Exors. of Whetstone	—	1
Victoria	Troughton	—	1
Charity	Addenbrooke and Pidcock	—	1
Oakthorpe	Marquis of Hastings' Exors.	—	1
Newbold	C. H. Plevins	—	1
Shireoakes	Shireoakes Colliery Company	—	1
Granville	Exors. of Cornt Grenville	—	1
	Total	25	24

—	Deaths from "Falls."	Coal raised.	Tons of Coal raised for each Death by Falls of Roof.
1867	25	7,600,000	304,000
1868	24	7,699,000	320,708

Nine deaths from shaft accidents, this is two less than the preceding year; five persons were killed by falling part way down, one, whilst ascending, one, a stone falling from the side, one, through defective machinery, and recklessness on the part of deceased, and others, and one, from the effects of an explosion of powder. Shafts.

Some of these were purely accidental, others however it cannot be denied with care might not have happened.

No. 3 in the schedule of accidents.

Joan Murpher, a sinker, was employed with others at the High Park Colliery, belonging to Messrs. Barber, Walker, & Co.; on the night of the 4th of January they were engaged in wedging the cast-iron tubbing in the upcast shaft, and to enable them to do this, a temporary scaffold was suspended for them to stand on.

It appeared from the evidence given at the inquest that for the purposes of the ventilation of the mine a large square hole was made in the centre of the platform. The men were lowered in a bucket, on to the platform, and deceased not knowing of this hole, stepped out, and fell to the bottom of the pit, and was instantly killed; the master

sinker knew deceased was an inexperienced man, yet he allowed him to descend without taking the precaution of warning him of the danger, or even giving him a light. I considered, and pointed out to the jury, the conduct of the man in charge of this work was most careless and reprehensible, he ought to have gone down, himself, first, and remained down whilst the men were at work, or until, he was relieved by another responsible person; the jury first, then, returned a verdict of manslaughter against the master sinker, but on further consideration of the same evidence, thought differently, and returned another verdict, that of accidental death.

The manager of the colliery did not further employ this master sinker.

No. 8 *accident.*

Benjamin Knight fell out of the cage in "coming up" an upcast shaft belonging to the Hawkesbury Colliery Company.

On examination I found the machinery generally in good working order, but the discharge of steam, and heat from the underground engine' boilers, made the shaft very hot, unusually so. The practice which prevails in some of the collieries in the Midland district, of lowering, and raising persons, through hot and unhealthy upcast shafts, is most objectionable. In this case he was supposed to have fallen accidentally out of the cage.

No. 28 *accident.*

Deceased met his death in passing under the shaft at Seymour Colliery, contrary to the rules; there is no necessity for passing under this shaft at any time, as there are proper roads around the pit bottom.

No. 29 *accident.*

John Holmes, a collier, was killed, and two other men were seriously injured in a shaft, at a small colliery, near the town of Clay Cross, belonging to Messrs. Smith, and Shepherd. A pair of shallow pits had recently been sunk to work a few acres of outcrop coal, and ironstone. Deceased and the two injured men, on the morning of the 7th July, in attempting to descend into the mine, jumped into a tub (which was used for the purpose of lowering, and raising persons, and material), and instantly all were precipitated to the bottom.

On examination I found the shaft was not fitted with guides, and the tub worked loose; it was fastened to the rope by means of a "ring and hook," and, to prevent it from unhooking itself, was tied with a piece of hemp yarn; when the tub was last at the bottom, the slack rope hung over its side and drew the hook out of the ring, fastening itself to the yarn, and was thus brought to the surface; the fastenings, or rope were not examined, and directly the men got on the tub the yarn gave way.

The colliery was not at work that day, and these men had no right to attempt to descend, as the bankman was away, and in fact there was no responsible man in charge of the place.

No. 52 *accident.*

ffocation gases.

Two men lost their lives at the Gresley Wood Colliery, on the 4th of November, through inhaling noxious gases.

The main coal of this district (Leicestershire) for the most part is liable to ignite spontaneously, and unless carefully watched is most dangerous.

In this case it appears the night fireman (or deputy underlooker) on the night of the 4th of November, went his usual rounds and returned to the bottom of the shaft; he was very much exhausted, and seeing the ostler he requested him to stop any person from going into No. 4 stall, as "there was a good deal of gas there." A few hours after this conversation the two men belonging to No. 4 stall, came down the shaft (one of them being the son of the ostler); they were told not to go to their work, it was not safe, and that the fireman was then in an unconscious state, lying near the furnace; this however, did not satisfy them, for they all three, (the father, his son, and another,) went into No. 4 stall, and on getting there one said "it is too strong for me, I shall go," and then they all left. In the morning the two men were missed, search was made, and their dead bodies found near the entrance to this stall; they had gone back a second time, after parting with the ostler, the coal was found to be on fire, and of course giving off the results of combustion, together with the decomposition of pyrites; death must have been instantaneous.

These poor fellows contributed, no doubt, to their own death, and there was therefore no criminal blame to attach to any one.

The colliery was in a very bad state, and quite unfit for persons to work in. The ventilation was defective, and through carelessness fires were constantly going on. I should state the present manager, Mr. Lewis, or indeed the owners, are not responsible for the condition of things, they had only been a few weeks in possession, and the manager very properly stopped the colliery, and no person has since worked there; and this seam of coal is now altogether abandoned. I consider the late owners, and their agents, have incurred great responsibility in ever allowing the works to get in the state it then was.

Explos of pow

I must once more point out the dangers arising from a want of care in the use of blasting powder, eight persons have been killed, and several others more or less seriously injured.

In one case, at Stoneyford Colliery, they were in the act of ramming the shot hole, when one of the men thinking the pricker was not sufficiently far in, knocked the end of it with his hammer, when it came in contact with some hard substance; an explosion was the immediate result: John Vickars was killed, and two others badly injured.

At Cinderhill Colliery a shot misfired, and instead of allowing some time to elapse before approaching the hole, Dennis Milward, a collier, insisted on going to see the cause of what he thought was a failure; when he got within a few yards of the hole the powder exploded and killed him.

Now this poor fellow had been cautioned by the fireman not to risk going, but to leave the place.

I have recommended the use of a copper pricker, and a wooden rammer, for stemming the first covering of the powder.

Never to try and drill out a shot hole, and not to go back for a considerable time after a shot has misfired.

There is, in my opinion, far too much powder used generally in getting coal; no doubt it saves trouble, it however, does great damage to the coal in blowing it small, and is always attended with more or less danger.

I hope the time is not far distant when the use of powder in mines, giving off gas, and working with safety lamps, will be a punishable offence.

Fines.

Proceedings have been taken against John Hall, of the Digby Colliery, Nottingham, for allowing a boy under age to work under ground. The poor lad was only eleven years of age; he fell in bringing loaded coal tubs to the shaft, and was killed. The magistrates fined Hall 10*l*. The general management of this colliery is most defective, no regard is paid to the observance of the special rules, and I thought it necessary, with your permission, to make an example of this person; Messrs. Shepherd and Smith were also summoned and fined for violations of the general rules.

Compl

Complaints have been received from colliers and others of the condition of some of the mines; they have always had my best attention, and all suggestions I have found necessary to make, have been carried out.

Boys under age are still employed in some of the collieries, but never I think with the consent of the owners; age is often misrepresented, and colliers take their sons into the mines with them without the knowledge often of the agent. At most of the collieries, schools are provided, but the difficulty is to get parents to send their children to them. Much remains yet to be done in the way of education, and no boy in these days ought to be allowed to enter a colliery until he can read and write.

Two deaths by falls of roof, four in shafts, and one miscellaneous.

Ironst mines.

The shafts are on the outcrop of the coal field; they are often badly cased, badly fitted, and left in charge of young lads. The case of overwinding, happened in a "gin" pit; a boy tried to raise a man out of the shaft, and for a balance weight he filled a tub with bricks, it was however much too heavy, and the boy was overpowered, the loaded tub drew the man to the top, snapped the rope, and he fell to the bottom, and was instantly killed.

The number of collieries in this district are about 195; they are many of them of considerable depth, and in time, as the outcrop mines become exhausted, their places will be occupied by the deeper ones, of course presenting more danger, on account of their depth, and consequent large area of coal which will have to be worked from them; it may also reasonably be expected, that the undrained coal, will give off more inflammable gas, and generally, the opening out, and working of large collieries will require skilful and educated engineers.

Inspec of min

The extraordinary and rapid development of the coalfields of this country, the large increase in the quantity of coal raised, as well as the great area of coal necessarily worked from deep shafts, ought to be taken into consideration in estimating a comparative death-rate from accidents in mines. I am fully satisfied that, up to this, inspection of mines has

been attended with beneficial results; but, as regards the important question of more frequent and more complete inspection, I am of opinion, having given the whole question my most earnest consideration, and having had a long experience as an Inspector, nearly thirteen years, that any great extension of the system of inspection will not be attended with good results; it will have the effect of relieving the owners and agents of that responsibility which properly belongs to them, and them alone. To make an inspector in any way responsible for the safety of the mine, there will have to be as many of them as there now are colliery viewers. The inspector is always in his district, ready to investigate accidents, and to give advice in any matter presenting a difficulty.

Possibly some of the districts may be too large; a re-arrangement of them, and the appointment of one or two additional inspectors, would, I believe, meet the present wants. No amount of inspection will prevent accidents altogether in an occupation attended with so much danger; all that can be done is to reduce them to the lowest possible point. Of late years, since the passing of the Mines Regulation Act, marked improvement has taken place in the management of mines, in the employment of better machinery, and in the generally more efficient ventilation of them.

I have, &c.

THOMAS EVANS,

Inspector of Mines.

The Right Hon. H. A. Bruce, M.P.,
Her Majesty's Principal Secretary of State, Whitehall.

LIST of the FATAL COLLIERY ACCIDENTS, and LOSS of LIFE arising therefrom, in the MIDLAND DISTRICT during the Year ending 31st of December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Jan. 1	1	Stanton	Burton-on-Trent	Nadin and Co.	Samuel Oliver	Labourer	15	Crushed between railway truck and screen.	–	–	–	–	1	1
,, 2	2	Shipley	Ilkeston	E. M. Mundy	Jonathan Moore	Boy	14	Run over on incline	–	–	–	1	–	1
,, 17	3	Cotmanhay	Eastwood	Barber, Walker, and Co.	William Tunicliffe	Collier	36	Fall of bind from roof	–	1	–	–	–	1
,, 17	4	High Park	Eastwood	Barber, Walker, and Co.	Joan Murpher	Sinker	24	Fell off scaffold in shaft	–	–	1	–	–	1
,, 23	5	Morton	Clay Cross	William Jackson, M.P.	William Tracy	Collier	15	Fall of coal from side of heading	–	1	–	–	–	1
,, 28	6	Stoneyford	Eastwood	John Wooley	John Vickars	Ditto	42	Explosion of blasting powder	–	–	–	1	–	1
Feb. 6	7	Nesfield	Sheepbridge	Sheepbridge Coal and Iron Company.	William Johnson	Ditto	38	Fall of roof	–	1	–	–	–	1
,, 10	8	Hawkesbury	Bedworth	Hawkesbury Coal Company	Benjamin Knight	Ditto	41	Fell out of cage in coming up "the upcast shaft."	–	–	1	–	–	1
,, 20	9	Swannington	Ashby-de-la-Z'ch.	William Worswick	William Foster	Ditto	40	Run over underground incline	–	–	–	1	–	1
,, 20	10	Shire-oaks	Worksop	Shire-oaks Company, Limited.	James Maycock	Ditto	16	Fall of roof	–	1	–	–	–	1
,, 20	11	Victoria	Coventry	Troughton and Co.	Samuel Clark	Banksman	32	Run over on engine bank underground.	–	–	–	1	–	1
,, 25	12	Shipley	Ilkeston	E. M. Mundy	John Limit	Collier	27	Explosion of blasting powder	–	–	–	1	–	1
,, 26	13	Granville	Ashby-de-la-Z'ch.	Exors. of the late Cornt Grenville.	William Wignall	Ditto	32	Fall of coal badly supported	–	1	–	–	–	1
Mar. 3	14	Swanwick	Alfreton	W. P. Moorewood	George Legge	Ditto	26	Explosion of blasting powder in hard ground	–	–	–	2	–	2
					George Stephenson	Ditto	22							
,, 18	15	Morton	Clay Cross	William Jackson, M.P.	William Grey	Ditto	25	Fall of bind	–	1	–	–	–	1
,, 20	—	Tibshelf	Alfreton	E. Chambers	Levi Lea	Labourer	36	Railway truck run over him, not a colliery accident.	–	–	–	–	–	–
,, 27	16	Moorgreen	Eastwood	Barber, Walker, and Co.	E. Bradley	Sinker	48	Fall of stone sinking shaft	–	–	1	–	–	1
Apr. 15	—	Swannington, No. 4	Ashby-de-la-Z'ch.	William Worswick	John Halfpenny	Labourer	31	Crushed by a railway truck	–	–	–	–	–	–
,, 23	17	Swannington, No. 2	Ashby-de-la-Z'ch.	William Worswick	Solomon Siddons	Collier	29	Fall of coal	–	1	–	–	–	1
,, 18	18	Renishaw Park	Chesterfield	J. and G. Wells	Henry Monks	Boy	11	Run over by a railway truck	–	–	–	–	1	1
,, 25	19	Hucknall	Nottingham	Ellis and Co.	William Jackson	Collier	—	Fall of roof	–	1	–	–	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owners or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
May 2	20	Wilnecote -	Tamworth -	Perrins and Harrison -	Thomas Thomson -	Boy - -	15	Run over on incline underground	–	–	–	1	–	1
„ 18	21	Cinderhill -	Nottingham -	Exors. of Thomas North -	William Hardy -	Collier -	—	Explosion of gas - -	1	–	–	–	–	1
„ 20	22	Speedwell -	Chesterfield -	Staveley Company, Limited	John Beresford -	Ditto -	17	Fall of roof - - - -	–	1	–	–	–	1
„ 20	23	Sheepbridge -	Chesterfield -	Sheepbridge Company, Limited.	John Smith -	Ditto -	18	Fall of roof - - - -	–	1	–	–	–	1
„ 25	24	Old Hollingwood	Chesterfield -	Staveley Company, Limited	Martin Ruddy -	Ditto -	34	Fall of roof - -	–	1	–	–	–	1
„ 28	25	Birchwood -	Alfreton - -	Charles Seeley - -	John Sharp -	Driver -	13	Run over on incline underground	–	–	–	1	–	1
June 19	26	Swannington -	Ashby-de-la-Z'ch.	William Worswick -	Matthew Martin -	Collier -	29	Fall of stone from roof - -	–	1	–	–	–	1
„ 27	27	Lings - -	Chesterfield -	Wingerworth Coal Company	John Winter -	Incline rider	17	Run over on underground incline	–	–	–	1	–	1
July 2	28	Seymour - -	Chesterfield -	Staveley Iron and Coal Company.	John Cross -	Collier -	19	Struck by the cage, passing under shaft contrary to orders.	–	–	1	–	–	1
„ 7	29	Danesmoor -	Clay Cross -	Smith and Shepherd -	John Holmes -	Ditto -	28	Fell down shaft, defective machinery.	–	–	1	–	–	1
„ 16	30	Digby - -	Nottingham -	Digby Colliery Company -	William Vaeley -	Driver -	11	Run over, roads in a very bad state, badly supported.	–	–	–	1	–	1
„ 23	31	Nuneaton New Colliery.	Nuneaton -	Nuneaton Colliery Company	Richard Rycote -	Sinker -	28	Explosion of blasting powder -	–	–	1	–	–	1
„ 23	32	High Park -	Nottingham -	Barber, Walker - -	Fred Buxton -	Collier -	32	Fall of roof - - - -	–	1	–	–	–	1
„ 25	33	Ripley - -	Alfreton - -	Butterley Company -	Thomas Parker -	Ditto -	22	Fall of roof - - -	–	1	–	–	–	1
„ 30	34	High Park -	Nottingham -	Barber, Walker - -	Elijah Snow -	Ditto -	42	Fall of roof - - - -	–	1	–	–	–	1
„ 30	35	Clay Cross - -	Chesterfield -	William Jackson, M.P. -	John Price -	Ditto -	22	Fall of roof - - -	–	1	–	–	–	1
Aug. 1	36	Whitwick -	Coalville, Leicester	Exors. of J. Whetstone -	William Holt -	Loader -	23	Fall of stone on main road -	–	1	–	–	–	1
„ 3	37	Skegby - -	Mansfield -	Skegby Colliery Company	John Reynolds -	Engineman	19	Foot injured by an iron bar falling on it.	–	–	–	1	–	1
„ 5	38	Britain - -	Alfreton - -	Butterley Company -	William Green -	Driver -	15	Fell out of cage part way down -	–	–	1	–	–	1
„ 15	39	Cinderhill -	Nottingham -	Exors. of Thomas North -	Dennis Milward -	Collier -	34	Explosion of blasting powder -	–	–	–	1	–	1
„ 21	40	Victoria - -	Coventry -	Throughton - -	Thomas Kimberley	Ditto -	—	Fall of roof - - -	–	1	–	–	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Aug. 25	41	Campbell	Chesterfield	Staveley Iron and Coal Company.	Thomas Branson	Enginewright	37	Fell down shaft whilst fixing pumps.	–	–	1	–	–	1
„ 27	42	Morton	Chesterfield	William Jackson, M.P.	Thomas Cooper	Labourer	30	Crushed by tub	–	–	–	1	–	1
Sept. 1	43	Denby	Belper	W. D. Lowe	Thomas Brown	Pitman	45	Fell off scaffold whilst fixing stays in shaft.	–	–	1	–	–	1
„ 16	44	Alma	Chesterfield	Limited Company	John Lomas	Inclineman	30	Run over on incline	–	–	–	1	–	1
Oct. 2	45	Swanwick	Alfreton	W. P. Morewood	Albert Staples	Collier	—	Explosion of blasting powder	–	–	–	1	–	1
„ 10	46	Ibstock	Leicester	Whetstone	Charles Boobier	Driver	13	Crushed by tubs	–	–	–	1	–	1
„ 13	47	Charity	Bedworth	Addenbrooke and Pedcock	Richard Croft	Collier	36	Fall of roof	–	1	–	–	–	1
„ 15	48	Nesfield	Chesterfield	Sheepbridge Iron Company	George Lowe	Ditto	30	Fall of roof	–	1	–	–	–	1
„ 21	49	Oakthorpe	Ashby-de-la-Z'ch.	Exors. of Marquis of Hastings.	William Jones	Ditto	28	Fall of roof	–	1	–	–	–	1
„ 23	50	Cotes Park	Alfreton	James Oakes	Charles Heydom	Inclineman	35	Run over on surface incline	–	–	–	–	1	1
„ 23	51	Hawkesbury	Bedworth	Hawkesbury Coal Company	William Lea	Collier	19	Fell into shaft	–	–	–	1	–	1
Nov. 4	52	Gresley	Burton-on-Trent	Gresley, Limited	Edward Stanford William Sherman	Ditto Ditto	26 21	Suffocation by the gas given off from a spontaneous fire	–	–	–	2	–	2
„ 2	53	Victoria	Coventry	Troughton	George Irvin	Ditto	21	Run over	–	–	–	1	–	1
„ 5	54	Clay Cross	Chesterfield	William Jackson, M.P.	Peter Kite	Ditto	25	Explosion of blasting powder	–	–	–	1	–	1
„ 23	55	Newbold	Chesterfield	C. H. Plevins	John Barnett	Overman	55	Fall of roof	–	1	–	–	–	1
„ 26	56	Clay Cross	Chesterfield	William Jackson, M.P.	G. H. Russell	Driver	14	Run over	–	–	–	1	–	1
Dec. 16	57	New Hollingwood	Chesterfield	Staveley Coal and Iron Company.	Brigham Laxton	Collier	18	Fall of coal and clod	–	1	–	–	–	1
„ 24	58	Swannington	Ashby-de-la-Z'ch.	William Worswick	Fred Whittaker	Ditto	32	Fall of roof	–	1	–	–	–	1
								Total for the year	1	24	9	23	3	60

LIST of the FATAL IRONSTONE MINE ACCIDENTS, and LOSS of LIFE arising therefrom, in the MIDLAND DISTRICT during the Year ending 31st of December 1868.

Date.	No. of Accidents.	Name of Mine.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Feb. 1	1	Morley Park -	Belper - -	C. H. Disnay - -	John Refern -	Miner boy -	12	Fell down shaft ascending -	–	–	1	–	–	1
„ 19	2	Walton - -	Chesterfield -	Appleby and Co. - -	Jno. Adlington -	Collier -	53	Fall of the sides of the shaft -	–	–	1	–	–	1
Apr. 15	3	Denby - -	Belper - -	Dawes - - -	William Whiteman	Miner -	23	Overwinding a gin pit - -	–	–	1	–	–	1
„ 20	4	Hungerhills -	Chesterfield -	Wingerworth Iron Company	William Raddish -	Ditto -	–	Fall of roof - - -	–	1	–	–	–	1
„ 25	5	Charity - -	Bedworth -	Addenbrooke and Pedcock	Rd. Wilkinson -	Ditto -	–	Fall of roof - - -	–	1	–	–	–	1
Oct. 22	6	Ripley - -	Alfreton - -	Bullerley Company -	George King -	Driver -	14	Fell down shaft - - -	–	–	1	–	–	1
Dec. 8	7	Charity - -	Bedworth -	Addenbrook - -	Thomas Ballin -	Miner -	22	Finger pinched, locked jaw -	–	–	–	1	–	1
								Total - - -	–	2	4	1	–	7

1st March 1869.

THOMAS EVANS.

Mr. Wynne's Report.

Report on the Inspection of Mines for the District comprising North Staffordshire, Cheshire, and Shropshire, for the Year ending 31st December 1868.

Sir, Stone, February 27th, 1869.

I have the honour to report to you my proceedings as an Inspector of Mines during the year 1868, and in doing so will endeavour to point out some of the defects in the practice of mining which have led to serious loss of life; and although the list of accidents and deaths will bear a comparison with many former years, yet it is not what it ought to be, and what it would be if stricter discipline were enforced in the pits, and a compliance with the rules more rigidly required; for it rarely happens that an enquiry into the cause of an accident takes place, without revealing some extremely bad discipline, or some gross disregard of one or more of the special rules. Indeed there are but a few collieries where these rules are properly enforced.

Explosions of Fire-damp

Have not been so frequent or so fatal as in former years. Seven fatal explosions have happened, by which nine persons lost their lives. Two of these occurred at the Lilleshall Company's Works, one on the 24th January in a sinking pit, and one on the 25th September of rather a serious nature. It appeared that the pit had been "laid by" for a few days, and the furnace let out whilst the upcast shaft was repaired, and whilst this was being done some water had accumulated in a low part at the far end of the workings, which was to be drawn out on the 25th; but Pickering, one of the deceased, hired a strange man to go with him on the 24th, and when they had finished their work and closed the doors the gas followed them and fired at their naked lights. Had the charter master obeyed the instructions given him "not to send the pony down until the 25th," the deceased men would not have gone, and all would have been right, as the men in a lower seam were preparing to light the furnace fire when this happened.

The next most serious one was at Oldfield Colliery, near Longton, on the 7th July, and I cannot put the case clearer than by giving an epitome of David Booth's evidence at the inquest. He said, "I have been a butty some years under my father. I told Corbett the underlooker, when he was last in the pit, that there was gas in the old drum road, level with the drift; I told my father as well many a time; I told him we were short of ventilation, and ought to have a fire at the Ash coal. He said he had told Corbett, but I was not present when he did so; there were about 12 yards of gas and about a foot thick in the goaf. I fired three shots that morning; there was an explosion after the last shot, and soon after another explosion that burned us all." Here they were using lamps as a safeguard against the gas in the goaf; but it is a complete farce to use locked lamps and at the same time allow shots to be fired in the most dangerous parts of the mine, or indeed to use powder at all where lamps only are allowed.

On the 11th July three men were timbering a road at Madeley Wood Colliery, and although they knew there was gas in the "pothole" above them, placed their candle in the way the gas must travel, and when they threw the dirt up it displaced the gas and burnt two of the men. Now the simplest care and precaution in this case would have saved these men.

Falls of Coal and Roof.

Under this head I am sorry to say there is no improvement, 28 accidents having caused the death of 28 persons, which is much in excess of what it ought to be, and it is mainly owing to neglect of the 18th special rule, and the want of some one directly employed by the owner to see that timbering is regularly and properly done; for it is due to them to say that in nearly every case the supply of timber is proved to be plentiful and of good quality, but the failure is in want of discipline and care on the part of the workmen. The butty says to his men, "Now lads, mind and keep yourselves safe,"

and then leaves them, and goes to look after that part of his business which has by some means or other to be made profitable. Now if the butty system must still prevail, the owner ought to employ a man in every pit, independent of the butty, to see to the safety of the men, and to send men out of the pit if they will not obey the rules, as an example to the other workmen; but now that it is entirely left to the butty, he is far more likely to look over their faults than suffer pecuniary loss by losing their labour. Then and not till then shall we see this class of accidents materially reduced.

In shafts.

When reporting on the year 1867, I said, "The loss of life under this head is discreditable," and drew a comparison between my district and Durham; and I am happy to say the reproach is somewhat lessened in its force, by reducing the number who have lost their lives, from 20 in 1867, to 10 in 1868, a number still in excess of what it ought to be. Three men lost their lives at Kidsgrove by the breaking of a wire rope, owing to the use of a wire rope under circumstances totally unfit for the application of that material, the drum being 4½ feet, and the pulley only 4 feet; and to hasten the crisis the rope was taken off the drum and got a "kenk" from some irregular coiling. There have been three cases of falling from mouthings, and each may be attributed to the want of knowledge on the part of the managers, who prefer the old and rude mode of winding with half scaffolds at the mouthings, to the simple and safe mode of guides and cages. Two cases have occurred of falling into shafts from the pit bank, one of which was sent to Stafford Assizes to be enquired into, but as usual the feeling prevailed "that the prisoner did not do it on purpose," and he was of course acquitted. This case arose at Mr. Heath's Colliery at Norton, where the banksman believing the cage was as usual over the pit mouth, walked backwards with his tub behind him; but in the meantime the engineman neglecting his duty allowed the engine to "creep" and raise the cage about 4 feet, or sufficient to allow the poor fellow to walk backwards into the pit. This case showed more clearly than usual how anxious all parties are at first to fix the blame on the right person, so that nothing comes of it; but when the coroner's jury found a verdict of manslaughter, reaction set in, and all parties, from the owner downwards, were ready with excuses for the culprit that were not even hinted at before. The other cases call for no particular remarks, but it is to be hoped that all persons in authority will see that most of these accidents are preventible, and use their best endeavours to make them of very rare occurrence.

Miscellaneous Underground.

Under this head the number is the same as the year before, and much of the same character, trams and tubs doing the mischief that gunpowder and inclines have not done. However singular I may appear in giving such an opinion, every inspection convinces me more and more that the use of powder in coal mines is a mistake, and the sooner the use of it is prohibited the better it will be for all parties; many men are killed by it, but far more are maimed for life. One half of the explosions of fire-damp are traceable to firing shots, and a vast number of accidents from falls of roof are caused by the shattered condition of shale roofs after blasting to the extent now practised. There seems a growing disposition to employ persons of more mature age on inclined planes, which will tend to prevent accidents, and be found more profitable, owing to the greater regularity in keeping up the supply of coal. Two accidents have occurred through falling down "staple pits," which is rather unusual in this district, but in neither case did any serious blame attach to any one but the deceased themselves, who were trying to do without help work that required assistance.

On Surface.

One of the most serious boiler explosions that we have had for many years occurred at Shelton Colliery on the 31st July, and although part of the boiler was carried several hundred yards, and fell in the Shelton Bar Iron Works, only one person lost his life. It appeared that all the boilers at the colliery were under the inspection of Mr. E. B. Martin and his assistants, and that it had been reported as defective but always repaired at once; which shows that no boiler is equal to a great pressure of steam, after once it shows great symptoms of wear and tear leading to leakage. The three cases where lives have been lost by machinery, are due to want of care in the management of such machinery. In the first case the engineman must have been asleep, and drew the water barrel over the pulley at such speed that it went over the engine-house, falling on a man

who was lying between the boilers. In the second a boy was climbing over a part of the engine, and fell between the cog-wheel and pedestal. And in the third the engine-man was lifting at the flywheel to start it over the centre without placing any one to control the engine when it started, and the steam being full on, the man was thrown into the race and crushed by the flywheel.

Ironstone Mines.

The accidents in this class of mines are not on the increase, but it requires the utmost care and watchfulness on the part of persons in charge of ironstone workings to prevent men running great risks; for where the coal and stone are from 5 to 8 feet thick, the fall of a small piece of stone on a man is almost certain death; and the temptation is also great when in bringing back pillars they see the crush of the roof on the pillars getting the stone ready for them, and only requiring extra risk and daring to make it profitable though hazardous work. At the Old Park in Shropshire, they drove up from the new mine coal level into the white flats ironstone, a rise of 30 feet, and brought the air from an old level in an air-pipe to the entrance of this place, but took no precautions to prevent the air from returning to the upcast shaft; and although the men were working at the top of this rise, 20 yards beyond the air, and with a face of work 30 or 40 yards long, the colliery manager seemed astonished that an explosion of fire-damp should occur; and when I summoned the principal agent for a breach of the 1st general rule, he called the manager and the consulting viewer to prove that the place was exactly in the state that it ought to be in; but the magistrates did not concur in this nonsensical view of the case, and fined the agent £15 and expenses.

The subject of the education of miners' children will, I hope, again be brought prominently forward and something be done to fix the responsibility of allowing boys under age to work in mines on the parents, who well know the age of their children and should be held responsible for the education and proper training of their boys. Whenever I see a boy in the pit whose age appears doubtful, the answer to my question is, "Oh I'm just turned 12," from which the inference may be drawn that they are pretty well schooled on that subject.

I have, &c.
THOMAS WYNNE,
Inspector of Mines.

The Right Hon. H. A. Bruce, M.P.,
Her Majesty's Principal Secretary of State.

List of the Fatal Colliery Accidents, and Loss of Life arising therefrom, in the North Stafford, Shropshire, and Cheshire District, during the Year ending 31st December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Jan. 6	1	Coed-y-goc	Oswestry	W. O. Savin	T. Jones	Stoker	40	The water barrel drawn over pulley fell on deceased.	–	–	–	–	1	1
„ 9	2	Talke-o'-th'-Hill	Newcastle	North Stafford Coal Company.	H. Jones	Waggoner	21	Tub got loose on jigbrow and crushed him.	–	–	–	1	–	1
„ 14	3	Granville	Wellington	Lilleshall Company	A. Hayward	Ditto	13	Waggon went over him on the road	–	–	–	1	–	1
„ „	4	Leycett	Newcastle	Crewe Coal Company	D. Pearson	Manager	60	Drum got loose from driving wheel	–	–	1	–	–	1
„ 18	5	Apedale	Ditto	Apedale Company	Peter Ryley	Collier	—	Fall of coal	–	1	–	–	–	1
„ 30	6	Bucknall	Hanley	Bucknall Company	C. Bailey	Labourer	—	Fell 28 feet into sinking pit whilst pumping.	–	–	1	–	–	1
Feb. 3	7	Lilleshall	Wellington	Lilleshall Company	Jas. Hicks	Sinker	43	Explosion of fire-damp	1	–	–	–	–	1
„ 6	8	Bollington	Macclesfield	Jno. Vere	W. Hordern	Collier	30	Explosion of a shot	–	–	–	1	–	1
„ 21	9	Adderley Green	Longton	Stirrup and Pye	S. Rhodes	Loader	33	Fall of roof	–	1	–	–	–	1
„ 29	10	Clough Hall	Newcastle	Kinnersley and Co.	J. Foden & 2 others	—	—	Rope broke whilst ascending	–	–	3	–	–	3
„ „	11	Hayes Wood	Ditto	Burgess and Procter	T. Farrington	Collier	—	Fall of coal	–	1	–	–	–	1
Mar. 12	12	Poynton	Stockport	Lord Vernon	J. Hill	Ditto	38	Fall of roof	–	1	–	–	–	1
„ 25	13	Adderley Green	Longton	Stirrup and Pye	J. Gould	Ditto	—	Fall of coal	–	1	–	–	–	1
„ 31	14	Madeley Wood	Ironbridge	Anstice and Co.	T. Parker	Driver	13	Crushed by a waggon in the level	–	–	–	1	–	1
„ „	15	Stonetrough	Tunstall	Williamson, Brothers	J. Conway	Collier	44	Fall of roof	–	1	–	–	–	1
Apr. 2	16	Woodshutts	Newcastle	Woodshutts Company	W. Wood	Boy	—	Crushed by cog wheel	–	–	–	–	1	1
„ 6	17	Madeley Wood	Ironbridge	Anstice and Co.	W. Taylor	Ditto	—	Fall of roof	–	1	–	–	–	1
„ 9	18	Apedale	Newcastle	Apedale Company	J. Johnson	Collier	50	Ditto	–	1	–	–	–	1
„ „	19	Norton	Burslem	R. Heath	Jno. Baker	Banksman	50	Fell down the pit	–	–	1	–	–	1
„ 22	20	Lilleshall	Wellington	Lilleshall Company	M. Bradley	Ditto	—	Fall of roof	–	1	–	–	–	1
„ 25	21	Greenfield	Tunstall	W. Adams	J. Stannaway	Collier	43	Suffocated by carbonic acid gas	–	–	–	1	–	1
May 1	22	Moss Fields	Longton	Hawley and Co.	Jno. Price	Ditto	44	Fell from a mouthing	–	–	1	–	–	1
„ 5	23	Norton	Burslem	R. Heath	M. Massey	Hooker-on	—	Crushed under the cage	–	–	–	1	–	1
June 1	24	Silverdale	Newcastle	Silverdale Company	Jno. Perry	Ditto	—	Fall of roof	–	1	–	–	–	1
„ 17	25	Ditto	Ditto	Ditto	T. Massey	Loader	19	Fall of coal	–	1	–	–	–	1
„ 19	26	Billingley	Bridgnorth	W. Breakwell	J. Berry	Boy	—	Fell off the skep whilst ascending	–	–	1	–	–	1
„ 29	27	Dunkirk	Dukinfield	Dunkirk Company	J. Percival	Collier	35	Fall of roof	–	1	–	–	–	1
July 7	28	Oldfield	Longton	T. Goddard and Sons	J. Booth & another	Ditto	—	Explosion of fire-damp	2	–	–	–	–	2
„ 9	29	Shelton	Hanley	Earl Granville	Jno. Keen	Ditto	42	Fall of coal	–	1	–	–	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
July 16	30	Blakelow	Hanley	Simpson and Blakie	R. Edwards	Collier	28	Fall of coal	—	1	—	—	—	1
„ 23	31	Talke-o'-th'-Hill	Newcastle	North Stafford Coal Co.	J. Cooper	Driver	13	Fell down a staple pit	—	—	—	1	—	1
„ 24	32	Madeley Wood	Wellington	Anstice and Co.	R. Griffiths	Collier	35	Explosion of fire-damp	1	—	—	—	—	1
„ 31	33	Shelton	Hanley	Earl Granville	W. Shaw	Stoker	19	Explosion of a boiler	—	—	—	—	1	1
Aug. 27	34	Norton	Burslem	R. Heath	W. Slater	Collier	48	Fall of roof	—	1	—	—	—	1
Sept. 1	35	Ketley	Wellington	Ketley Company	Jno. Jones	Driver	13	Fell off waggon and crushed	—	—	—	1	—	1
„ 11	36	Norton	Burslem	R. Heath	S. Sherratt	Ditto	22	Ditto	—	—	—	1	—	1
„ 25	37	Lilleshall	Wellington	Lilleshall Company	A. Pickering and another.	—	—	Explosion of fire-damp	2	—	—	—	—	2
Oct. 3	38	Podmore Hall	Newcastle	Woodshuts Company	G. Sumnall	Driver	16	Fall of roof	—	1	—	—	—	1
„ 5	39	Norton	Burslem	R. Heath	J. Clewlow	Collier	62	Fall of coal	—	1	—	—	—	1
„ 10	40	Mear Heath	Longton	W. H. Sparrow and Son	Jno. Perry	Ditto	26	Fell under tub on incline	—	—	—	1	—	1
„ 13	41	Adlington	Macclesfield	Leigh	Chas. Walton	Ditto	21	Fall of roof	—	1	—	—	—	1
„ 16	42	Silverdale	Newcastle	Silverdale Company	J. Scott	Ditto	21	Ditto	—	1	—	—	—	1
„ 19	43	Bycars	Burslem	Exors. of Wedgwood	D. Clews	Ditto	46	Ditto	—	1	—	—	—	1
„ 20	44	Apedale	Newcastle	Apedale Company	J. Higginbottom	Ditto	29	Fall of coal	—	1	—	—	—	1
Nov. 1	45	Norton	Burslem	R. Heath	W. Knight	Labourer	38	Fell into race whilst lifting the wheel.	—	—	—	—	1	1
„ 5	46	Adderley Green	Longton	Stirrup and Pye	Peter Merry	Collier	23	Fall of coal	—	1	—	—	—	1
„ 7	47	Jackfield	Burslem	Plant and Co.	J. Capewell	Loader	23	Fell from a mouthing	—	—	1	—	—	1
„ 21	48	Kingsley	Cheadle	Jno. Carr	J. Carr	Sinker	—	Fell off scaffold	—	—	1	—	—	1
„ 23	49	Sneyd	Burslem	C. and J. May	D. McNicholas	Loader	36	Fall of roof	—	1	—	—	—	1
„ 26	50	Berry Hill	Hanley	W. Bowers	T. Poyser	Collier	45	Explosion of fire-damp	1	—	—	—	—	1
Dec. 1	51	Dawley	Wellington	Coalbrookdale Company	G. Richards	Ditto	53	Fall of roof	—	1	—	—	—	1
„ 9	52	Oldfield	Longton	T. Goddard and Sons	R. Bridge	Butty	42	Ditto	—	1	—	—	—	1
„ 13	53	Bentilee	Ditto	Hawley and Co.	W. Johnson	Collier	40	Explosion of fire-damp	1	—	—	—	—	1
„ „	54	Berry Hill	Stoke	W. Bowers	G. Emery	Ditto	42	Fall of coal	—	1	—	—	—	1
„ 21	55	Glebe	Fenton	Challinor and Co.	T. Lee	Ditto	45	Explosion of fire-damp	1	—	—	—	—	1
„ 24	56	Dawley	Wellington	Coalbrookdale Company	R. Jenks	Ditto	—	Fall of roof	—	1	—	—	—	1
„ 28	57	Lightmoor	Ditto	Ditto	G. Clarke	Driver	15	Ditto	—	1	—	—	—	1
								Total	9	28	10	10	4	61

LIST of the FATAL IRONSTONE ACCIDENTS, and LOSS of LIFE arising therefrom, in the DISTRICT of NORTH STAFFORD, SHROPSHIRE, and CHESHIRE, during the Year ending 31st December 1868.

Date.	No. of Accidents.	Name of Mine.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Jan. 17	1	Lawley	Wellington	Coalbrookdale Co.	T. Morris	Driver	16	Fall of roof in the road	–	1	–	–	–	1
,, 20	2	Donnington	Ditto	Lilleshall Co.	M. Tonks	Miner	21	Fall of roof	–	1	–	–	–	1
,, 24	3	Dawley	Ditto	Coalbrookdale Co.	J. Corbett	Driver	12	Fall of roof in the road	–	1	–	–	–	1
,, ,,	4	Millbank	Newcastle	J. H. Pearson	J. Browning	Miner	66	Fall of roof	–	1	–	–	–	1
Mar. 18	5	Chatterley	Tunstall	Chatterley Co.	T. Foster	Ditto	28	Fell down a staple-pit underground	–	–	–	1	–	1
April 7	6	Ditto	Ditto	Ditto	Jno. Roberts	Ditto	41	Fall of ironstone	–	1	–	–	–	1
,, 9	7	Ditto	Ditto	Ditto	T. Porter	Sinker	—	Fell out of bowk whilst descending	–	–	1	–	–	1
May 12	8	Chell	Ditto	R. Beswick	W. Evans	A boy	—	Fall of roof	–	1	–	–	–	1
,, 14	9	Priorslee	Wellington	Lilleshall Co.	Chas. Hassall	Miner	28	Ditto	–	1	–	–	–	1
,, 17	10	Old Park	Ditto	Old Park Co.	H. Horton	Labourer	35	Fall of earth in an open work	–	–	–	–	1	1
June 8	11	Lilleshall	Ditto	Lilleshall Co.	H. Tonks	Hooker-on	16	Held the hook and ascended 5 yards, and fell.	–	–	1	–	–	1
,, 11	12	Silverdale	Newcastle	Silverdale Co.	G. Dean	Driver	30	Crushed in road whilst riding	–	–	–	1	–	1
,, 25	13	Chesterton	Ditto	Chesterton Co.	Jno. Briggs	Miner	40	Fall of stone	–	1	–	–	–	1
July 14	14	Chell	Tunstall	R. Beswick	J. Hancock	Ditto	37	Ditto	–	1	–	–	–	1
Sept. 12	15	Sneyd Green	Burslem	Silverdale Co	H. Beech	A boy	14	Crushed on a jig	–	–	–	1	–	1
,, 15	16	Newchapel	Tunstall	R. Heath	Jno. Lindop & anor.	—	—	Premature shot in sinking pit	–	–	–	2	–	2
,, 24	17	Madeley Court	Wellington	W. O. Foster	Jno. Beech	A boy	13	Held the hook, and drawn part way up shaft.	–	–	1	–	–	1
Oct. 17	18	Foley	Longton	T. Goddard & Sons	F. Humphries	Miner	26	Explosion of fire-damp	1	–	–	–	–	1
Nov. 2	19	Silverdale	Newcastle	Silverdale Co.	H. Sherratt	Ditto	20	Fall of stone	–	1	–	–	–	1
Dec. 23	20	Old Park	Wellington	Old Park Co.	Jno. Rogers	Ditto	40	Explosion of fire-damp	1	–	–	–	–	1
								Total	2	10	3	5	1	21

NUMBER and NATURE of FATAL ACCIDENTS to PERSONS employed in and about COAL MINES and COLLIERIES in the District comprising NORTH STAFFORD, SHROPSHIRE, and CHESHIRE, during the Years 1864, 1865, 1866, 1867, and 1868.

Year.		Explosions of Fire-damp.	Falls in Mine.			In Shafts.									Miscellaneous Underground.									On Surface.				Gross Totals.
			Falls of Coal.	Falls of Stone.	Total Falls in Mines.	Overwinding.	Ropes and Chains Breaking.	Whilst ascending or descending.	Falling into Shaft from Surface.	Things falling from Surface.	Falling from part way down.	Things falling from part way down.	Miscellaneous in Shafts.	Total in Shafts.	Explosions of Gunpowder	Suffocation by Gases.	Irruptions of Water.	Falling into Water.	On Inclined Planes.	By Trams and Tubs.	By Machinery Underground.	Sundries Underground.	Total { Miscellaneous Underground.	By Machinery on Surface.	Boilers Bursting.	Miscellaneous on Surface.	Total on Surface.	
1864	Number of Accidents - - -	13	4	9	13	–	2	1	4	–	3	1	–	11	1	1	–	–	1	2	–	–	5	2	–	1	3	45
„	Number of Deaths - - - -	22	4	9	13	–	2	1	4	–	3	1	–	11	1	1	–	–	1	2	–	–	5	2	–	1	3	54
1865	Number of Accidents - - -	6	9	13	22	2	1	1	2	–	2	–	–	8	1	–	–	–	2	2	1	1	7	2	–	–	2	45
„	Number of Deaths - - - -	12	9	13	22	2	1	1	2	–	3	–	–	9	1	–	–	–	2	2	1	1	7	2	–	–	2	52
1866	Number of Accidents - - -	9	3	8	11	–	–	2	3	–	3	2	–	10	–	–	–	–	5	5	–	2	12	1	1	3	5	47
„	Number of Deaths - - - -	142	3	8	11	–	–	2	3	–	3	2	–	10	–	–	–	–	5	5	–	2	12	1	2	3	6	181
1867	Number of Accidents - - -	11	10	15	25	–	2	4	5	1	3	–	–	15	3	–	–	–	4	2	–	1	10	–	–	–	1	61
„	Number of Deaths - - - -	17	10	17	27	–	3	7	5	2	3	–	–	20	3	–	–	–	4	2	–	1	10	–	–	–	1	74
1868	Number of Accidents - - -	7	10	18	28	–	1	2	2	–	3	–	–	8	1	1	–	–	2	4	–	2	10	3	1	–	4	57
„	Number of Deaths - - - -	9	10	18	28	–	3	2	2	–	3	–	–	10	1	1	–	–	2	4	–	2	10	3	1	–	4	61

Mr. Brough's Report.

Report of the Working of the Mines Inspection Act (23 & 24 Vict. c. 151.) for the South-western District, during the year ended 31st December 1868.—By Lionel Brough, Esq., F.G.S.

Sir, Clifton, 27th February 1869.

I have the honour to remit, as required by the twenty-seventh section, the report for 1868 on the working of the Mines Regulation and Inspection Act of Parliament, 23 & 24 Victoria, cap. 151. Also, I beg to enclose the lists, fatal and non-fatal, of all the casualties that were notified to me throughout the entire year in the South-western Division of coal mines.

The death record, I am glad to say, is considerably reduced, the number of the killed gradually descending from eighty-two in 1865 to sixty-one in 1868, every succeeding year having been attended with decrease. This statement evinces itself in a still more marked manner when tested by the proportional calculation of quantity of coal to a single death: 1868 shows 101,639 tons, whilst in the previous year it stood at the less favourable ratio of 91,549 tons, a difference of more than 10,000 tons; and but for a prolonged "turn out" in a portion of the district, the "get" of coal would have been larger, and the results most probably would have been better just in that corresponding degree. These "strikes" inflict irreparable injury on colliery proprietors, on the workmen themselves, and on whole communities.

Commencing with "explosion of fire-damp," I beg permission to say, that that class of accident exhibits diminution in a most especial manner, one person only having been killed in all the year, and even that event should not by any means have taken place; it was a blunder, and had its source in ignorance. But one death by carburetted hydrogen in so fiery a district, is at the same time unusual and encouraging. Notwithstanding this good result we must continue to be unrelaxing, and leave no exertion unattempted, either legal or technical, to fight against this scourge to the coal miner. Amongst other efforts I would recommend that, in any new enactment, the three words "under ordinary circumstances" be omitted; that would render clear and distinct the first general rule of the present statute, and in my opinion would contribute to the saving of human life. Another great step would be to abandon altogether the use of gunpowder for the bringing down *of coal* in mines liable to fire-damp. Furthermore, air in abundance, no stint of safety officers, and the selection of the best possible class of safety lamps, are all most essential provisions. On this latter subject it is needful to state, that if at the speed of eight feet per second an ordinary "Davy" (and some lamps of other kinds) will pass the flame, then indeed our confidence becomes rudely shaken. But we must remember, that though eight feet per second is a rate of travel of the air often arrived at in the intakes (and even still more than that) of fairly ventilated collieries, it is by no means the fact that explosive mixtures are always met with passing at such a high speed, unless it be gas from some tremendous blower, and even that requires some little space of time to mix it up to the highest point of danger. Nevertheless, the able experiments lately entered into underground in the North, give rise to serious thought, and demand especial care in the use of the "Davy," or indeed, for that matter, of any other sort of lamp at present in use in all Britain.

The next column we come to embraces "falls of coal and stone," and I am sorry to say it undergoes no mitigation whatever in my district. Forty-three men and boys perished by this never-ceasing cause of disaster, whereas in 1867 only thirty-nine deaths occurred.

The return of lives lost by "falls" from the twelve districts of the kingdom in 1868, in collieries and in ironstone mines, unfortunately comes up to 484. Fire-damp itself, frightful as it is, very rarely indeed approaches any such record as this. When next the Act of Parliament undergoes revision, I trust a general rule will be added of a kind fully equal to the reduction of such vast destruction of life; or, full power be given for a special rule to the same effect, to be framed of course in accordance

with the nature of the stratification, not only of the district at large, but also of the varying parts of it, and even of each individual colliery. The opponents of change charge the Inspectors with making complaint of the loss of life by "falls," but say that they never propose a remedy. My reports at any rate contain suggestions to that effect as regards my own district. I have from time to time recommended the northern method of propping (that by the deputies); I have advised closer timbering; indeed, I have gone so far as to propose a stipulated number of supports per given area, whether the roof be strong or tender; it cannot therefore be said that I have failed to suggest remedial measures.

The mode of each person's death is distinctly and practically explained in the enclosed "Lists" therefore I need not make further observations on the lamentable loss of life by "falls of coal and stone," or quote any of the numbers of that fatal column here in the body of this report; there are far too many of them for exemplification.

The third record in the list is dedicated to death in "pit-shafts." I am thankful to say that only five took place in the year under notice; in 1867 exactly double that number of persons lost their lives from such cause.

An accident belonging to this column (enumerated in the list as 21) occurred at the Mells Colliery, near Frome, on the third of April, to John Cary, and requires far more comment than can be awarded to it in the mere "list." There is a "brow" some yards above the bottom inset of the pit, and Cary was the last of five persons that entered the cage in order to go to the surface, but instead of that they commenced to *descend*, and the cover caught the young man's leg before he was fairly inside, and so injured him that he soon afterwards died. At the inquest, a verdict of manslaughter was recorded against the bottom onsetter, and a true bill was found by the grand jury at the ensuing Wells assizes. However, when the man was put on his trial, the judge stated,—that having perused the evidence before the coroner, and especially that of the Government Inspector of Mines, he had observed that he then and there deposed that there existed at that particular pit "a complicated code of signals;" under these circumstances he (the judge) did not think the case could proceed further, whereupon the onsetter was liberated without evidence having been gone into at all, and so the proceedings entirely terminated. I quote the above number of the list, to show the necessity of proper signals. Moreover, I beg permission to state my opinion,—that intermediate "brows" in pit-shafts are most objectionable in that particular portion of my district, or indeed in any other, if they can but be reasonably avoided. Simple, clear, distinct signals would save many a life: this I have stated in most of my annual reports, never failing also to point out that we require *large* shafts, well lined from top to bottom; most abundant steam power; extremely strong ropes, with drums and pulleys of great diameter; high pit framing, and accurate "load indicators." These are some of the elements of human safety, as far as shafts are concerned.

Another pit accident must not be omitted, No. 24 of the list. The steam power was most limited, and of course not equal to large drums and strong ropes. The one that broke had been too long at work, and had become much deteriorated; the scaffold, under which two men were unfortunately then in the bottom of the shaft, was so thin and badly constructed as to offer no resistance to the accelerated descent of a ponderous body; so, when the inefficient rope snapped, the major portion of it crashed through the scaffold, and killed one of the above-mentioned persons, and at the same time injured the other, indeed it was almost a miracle that he contrived to escape at all. The whole arrangements were of such a miserable character, that, at the inquest, the jurors exhibited the strongest possible tendency to record manslaughter; however, guided by the coroner, they arrived at a less onerous conclusion.

There has been much ingenuity displayed for some years past in apparatus of divers kinds to act effectually when a rope breaks, and some of the methods arrived at are, no doubt, worthy of praise. But, in this class of accident, as in the employment of safety lamps in fiery mines, the contingency may arrive that neglect ensues; in the case of the lamps it may possibly give rise to restricted air passages, and equally so with the other life-preserving inventions there may ensue an indifference as to the integrity of the pit ropes, or, lulled into a feeling of security, to the efficacy of the patent machinery itself, and then perhaps may arrive a great calamity. In my opinion, there are no life-saving means that surpass vast initial strength in the usual winding apparatus itself. I prefer this open and straightforward method to the use of contrivances whose very principle may render them liable to entanglement and derangement.

It is absolutely necessary to be alive to all improvements and new processes, and to a certain extent to exert ourselves to help on that which we believe to be beneficial. But, practical knowledge alone can be relied on; experience always upsets mere theory.

However, it is but just to observe, that if an invention really possesses merit and originality it is sure of final success, in the end it cannot fail to be generally adopted. But I must repeat, that in abundant original force will be found the maximum means of safety. Even this should be accompanied by great sectional area in the pit, for there must be room for the plenitude of power. And, besides, there ought always to be a *sufficient number* of shafts; in the end it will be found, not only safer, but far more economical than putting all the strain on one, or even on two openings. It was at one time feared that Legislative interference on the point of additional shafts would extinguish the existence of many collieries. It does not appear, however, that the Act of Parliament 25 & 26 Vict. c. 79. (passed in 1862) has had that effect; on the contrary, since that measure came into operation, there has been as much and even more elasticity in the coal trade than ever there was before.

The last underground column in the list is headed "Miscellaneous," and I have much pleasure in stating that here again diminution is to be observed: in 1868, eleven persons were killed by this class of accident, whereas, during the previous year, fourteen unfortunately lost their lives from similar causes.

Entanglement by chains on inclines, the breaking of engine bank ropes, the crush of trams in levels, cross-headings, and stalls, and the careless or ignorant use of gunpowder, are the leading accidents under this head. With regard to persons getting seriously, and too often fatally crushed, I can only say that in my district many of these levels and cross-heading are narrow, the trams that are used are large and heavy, and casualties are thus continually brought about, often added to by the employment of hauliers too young and weak to "back" and "shaft" those ponderous vehicles on headings of considerable and varying gradients. It is not as in other parts, where the tub and its load is not *half* the weight that it is in Monmouthshire, Breconshire, and Glamorganshire; in the North of England young drivers are adaptable because of the habitual light loads there, but not so in the division of mines under my charge. Then, again, the taking away by these very hauliers of the young trappers with them, far from their doors, is a practice that I altogether protest against. Since I have been in the district my lists will show that the lives of very many of these mere tender children have been so sacrificed; however, as every one of my previous reports bear witness against this pernicious mode of employing the door boys, I need not now make further comment on the subject. If all collieries were laid out for the "tail-rope system" of transporting products underground, the killing of hauliers and other young persons, and the wearing out and destruction of poor horses, would be greatly lessened indeed.

Gunpowder, I regret to say, has caused the death of four persons out of the eleven of the "miscellaneous accidents." The first of these is No. 19 of the list:—A workman (probably an unskilled one), whilst ramming his charge, approached his candle so near to the shot hole as actually to ignite the powder. The second is No. 31:—A boy had got hold of some loose powder to which he had no claim whatever; then he had not the patience to wait till his day's work was finished, but actually began to amuse himself with the powder underground, when a portion of it that was in his pocket somehow or other became ignited, and so severely burned him that he did not long survive.

The third and last of these cases is No. 55, and is indeed a very painful instance of the improper use of gunpowder. Two men worked in a thin seam of coal, and powder was supplied to them to blast the hard top with to make room for the tubs, but they were especially ordered on no account whatever to waste it in coal; notwithstanding this they did put a shot hole in the seam, but they managed the job so unskilfully that the whole can of powder, two or three pounds in weight, ignited and burned them so dreadfully that they died some days after the accident. If men will kill themselves by disobedience to rules and orders, it is hard on owners, managers, and inspectors.

In the non-fatal list under this head are to be found several cases of the inconsiderate handling of this dangerous compound, and, what is worse, the use of steel prickers or needles: it is surprising the number of accidents throughout the kingdom that take place every year in consequence of the employment of steel implements instead of copper. Of course many of the tools must be of steel, but the pricker, the instrument most likely to do mischief, should invariably be made of copper. Then, also, the workmen are sometimes careless about fuses, and often do not use the right sort.

I now beg permission to quote two instances of the burning by gunpowder, but unaccompanied with fatal results:—Four or five persons had drilled a hole underground and charged it, they then hung up the tin of powder (some pounds in weight) on the rib exactly opposite the mouth of the shot hole, and not many feet from it. When they fired the shot the flame flew to the tin and ignited the powder; that was a matter

of course, but the stupidity of the act is really astounding. Thus it is, that the inspectors' lists, both fatal and non-fatal, get filled up and swollen by childish and inconsiderate conduct: men ought to be ashamed of such follies, it is bad enough in mere boys, as the following instance will show.

In the No. 4 pit at Sirhowy a youth was emptying from a paper parcel about three pounds of powder into a tin, when his father observed that many of the grains were scattered on the floor of the mine, and instantly removed his son's candle further back, and after that went in bye to his own working place. The boy then took the candle and positively set fire to those very grains, and the flash from them ignited the whole bulk of the powder, which he held in his other hand, and burned him most dreadfully. The special rules will have to be altered respecting gunpowder, and made very severe; I do not know any other way to check these worse than follies.

The last of all the five columns belongs to the surface, and No. 30 of the list is the case of a haulier falling under his tram whilst taking coal from the top of the pit. Crush of trams *underground* but too readily takes place in narrow roads and with a feeble light; however, on the surface such an accident is certainly far more preventible, as it is in the daylight, therefore for that very reason the more to be deplored, because in the case under notice death evidently arose from carelessness.

A shocking fatality occurred on the 26th of last October, which does not demand insertion in the "list," but would still not be justifiable to leave unmentioned. A collier boy coming from his work chose to get behind the buffer of a locomotive, in order to have a ride home; shortly after that the engine unfortunately came in contact with some railway trucks, and the boy's thigh was broken in pieces. He underwent amputation, but died almost immediately afterwards. The engine-driver should have been punished for allowing the poor child to encounter such dreadful danger; he must have known that he was highly culpable in permitting it.

Having now described all the occurrences *in coal*, I at once proceed to the details of the ironstone mines of the district, but I am unable to give quite so good an account of them as usual.

In pursuing their calling in these extensive establishments 16 persons lost their lives in 1868, whilst during the previous year the record was only 14; and yet there was but little, if any, increase in the production of that valuable mineral in the year now under notice. Of the above number, 13 met with death through the great prevailing cause of accident, "falls of roof and mine." The other three were killed by "miscellaneous causes" underground.

Then there were 20 non-fatal accidents in ironstone mines, whereby 22 persons were more or less injured.

The condensed return of all the district, and all its mines, both those of coal and of ironstone, will, for 1868, then be as follows:—Separate fatal accidents in coal 59, deaths therefrom 61; non-fatal in coal 106, inflicting injury on 117; fatal accidents in ironstone, 16, consequent deaths 16; non-fatal in ironstone, 20, causing hurt to 22; casualty from which the "list" is free, one, bringing about one death. Total, 202 separate accidents affecting 217 persons, of whom 78 were deprived of life and 139 underwent burnings, fracture, contusion, and in many cases amputation and other surgical operations.

No boiler explosion has been reported to me from any one of the five counties of my district, and it cannot be considered otherwise than remarkable, that, though it is more than 10 years since I was removed from Staffordshire to take charge of this south-western division of mines, but one life has been lost by boiler explosion on either side of the estuary in all that very long lapse of time.

I have now to make mention of an occurrence that certainly is of more importance than any other legal event in all the annals of inspection from the very first Act of Parliament even down to the present time now close upon 20 years.

On the 16th of June 1865, the gas fired in the new Bedwelty pits belonging to the Tredegar Iron Company, and both accident and results were of so grave and serious a character, that at the inquest the jury returned a verdict of manslaughter against the viewer; but at the Monmouth assizes the grand jury did not find a true bill. I was then ordered to prosecute the owners of the colliery for infringement of the Act of Parliament, and I lost no time in initiating the proceedings. After very many delays and protracted sittings, the magistrates decided against me, and my solicitors then applied for a case to be submitted to the Court of Queen's Bench, which was accordingly granted. All these details were at the proper time regularly and minutely reported to the Home Office, and, suffice it now to say, that in June 1868, the Justices of the Court of Queen's

Bench decided in manner as I now quote from the printed "Weekly Reporter" of that particular period.

"Q. B. June 4.

Brough, Appellant, v. Homfray and others, Respondents.

23 & 24 Vict. c. 151. s. 10.—Rules 1 & 2.—Colliery Ventilation.

Rule 1, under section 10 of the above Act, requires that an adequate amount of ventilation shall be constantly produced in all Coal Mines or Collieries and Ironstone Mines to dilute and render harmless noxious gases to such an extent that the working places of the pits, levels, and workings of every such colliery and mine, and the travelling roads to and from such working places, shall, under ordinary circumstances, be in a fit state for working and passing therein, &c. An information under this rule having been dismissed, and a case stated thereon,—

The Court, though sending back the case to be re-stated, intimated a strong opinion that not only the working places and roads in a colliery should be kept ventilated under this rule, but that so much of the colliery must be kept ventilated as will secure that the roads and working places shall not become inundated with foul air from other parts of the mine.

This was a case stated by Justices under 20 & 21 Vict. c. 43. on an information which they dismissed, and which was brought before them under the sections 10 and 22 of 23 & 24 Vict. c. 151. It charged that the Respondents, being the owners of a colliery, had not caused, in accordance with Rule 1, an adequate amount of ventilation to be constantly produced in such colliery to dilute and render harmless noxious gases to such an extent that the working places of the pits, levels, and workings of such colliery, and the travelling roads to and from such working places, shall, under ordinary circumstances, be in a fit state for working and passing therein.

It appeared that in the mine of which the Defendants were proprietors an explosion occurred causing the loss of several lives. It appears to have occurred in consequence of the accidental opening of a door by which a disused chamber, in which it appeared that gas had accumulated, had been shut off from the rest of the mine. This chamber or cavity had been properly fenced in accordance with Rule 2, which provides that places in which gas is suspected to have accumulated shall be kept properly fenced off. The men were killed at one of the working places, but in consequence of the escape of the gas from the disused chamber.

Manisty, Q.C. (*Matthews, Q.C.* with him), for the Appellant.—The owners of collieries are bound by the 10th section to keep the working places ventilated; and if, for this purpose, it is necessary to keep adjacent parts of the mine ventilated, they are bound to do so. In fact the obligation on them is to keep the mine ventilated so as to secure the safety of the workmen.

H. James, for Respondents, called attention to the second rule, which enjoins that places in which gas is suspected to have accumulated shall be kept properly fenced off. If the respondents were guilty of any offence it was under this rule for inefficient fencing. (Cockburn, C.J.—I understand the men were killed in the working places.) Yes, but in consequence of the escape of gas from a disused chamber through a door which had been opened by a boy. There is no information for inefficient fencing off, and indeed there is ample evidence that it was properly fenced off, and no accident would have occurred but for the opening of the door. (Cockburn, C.J.—That will not dispense with the necessity of ventilating or keeping ventilated the rest of the colliery.) There is no evidence that there was a want of ventilation where the accident occurred. (Cockburn, C.J.—You must do two things,—firstly, ventilate the working places; secondly, properly fence suspected places so as effectually to prevent persons entering the dangerous places. If, instead of ventilating a disused place, you shut it off, and some one afterwards opens the door of it, when gas has accumulated in it, and it escapes and causes an explosion, you are liable for not keeping it ventilated.) Where mines extend over miles, many disused chambers exist which it is impossible to keep ventilated. (Blackburn, J.—Where it is impossible to ventilate, or where cavities exist, then it is your duty to prevent the escape of gas by an air-tight wall.)

It was intimated by the Court after the argument that the case ought to be sent back to be restated, as the facts were not sufficiently brought before it to enable it to pronounce a final decision. So far, however, as the case went, the following opinions were delivered:

Cockburn, C.J.—We are agreed that the working place has not been kept ventilated. The provision of the statute is to the effect that the whole mine must be kept

ventilated so as to prevent the working places becoming dangerous by reason of gas accumulating in them. You must ventilate so much of it as that it will be safe for the working people. But the contention for the Defendants is that the accident was owing not to insufficient or imperfect ventilation, but to the act of a boy in opening a door which ought not to have been opened. However, this does not get over the difficulty that, as a fact, the mine was not kept sufficiently ventilated so as to secure the safety of the workpeople.

Blackburn, J.—I concur in the interpretation of the rule as laid down by my Lord. (Reads the two rules). The meaning is, that you shall ventilate the mine to such an extent that there will be no danger to the working places.

Mellor, J., concurred.

Lush, J.—I concur with the rest of the Court. I believe it is admitted that the place where the explosion occurred was, except so far as it was affected by the escape from the disused chamber, kept sufficiently ventilated.

Case remitted to be restated.

Attorneys for the Appellant, *Sharp & Ullithorne.*
Attorney for the Respondents, *T. Clark.*"

The whole of the above quoted case, with its elaborate matter and argument, I have copied, *verbatim et literatim*, from the "Weekly Reporter" of Saturday the 15th of August 1868.

I have to say in addition, that even after all this, it was still some considerable time before the same Justices of the Peace for the county of Monmouth were enabled to sit for a re-hearing in the town of Tredegar. But, however, finally, at the very long interval of three years and five months from the date of the explosion, the case—that of disobedience of the First General Rule of the Act of Parliament 23 & 24 Victoria, c. 151.—was again gone into, and a conviction was recorded in my favour, accompanied by the infliction on the Defendants of the mitigated fine of five pounds and costs; and, still later on, the Judges of the Court of Queen's Bench made an order that the said Defendants should likewise pay the costs of the special case.

The last observation I have to make on this exceedingly protracted litigation is, that it has been the means of bringing about so admirable an interpretation of that particular portion of the Act of Parliament, that I believe, if due consideration be but given to it, the ruling of the Justices of the Court of Queen's Bench will be equal in useful effect, as far as explosions of fire-damp are concerned, to the appointment of an increase to the present staff of Inspectors. When the law is thus clearly laid down, our arduous duty is rendered lighter and easier, and more abundant satisfaction will be given both to the Government of the nation, and to the public at large. It may not be inopportune here for me to beg permission to repeat the recommendation I made before the "Select Committee on Mines" some time ago, that, for the better administration of the Mining Acts of Parliament, the appointment of Stipendiary Magistrates in crowded districts would greatly tend to simplification, and would obtain the highest possible approval from all who are concerned in the greatest of all branches of British industry—that of mining for coal and for ironstone.

Of late the employment of scientific apparatus underground has attracted increased attention; though, as I have stated in previous annual reports, the idea is by no means new, on the contrary, such instruments have long been used, and for the most part their value in colliery operations has met with the most thorough appreciation. More especially has the oscillation of barometrical pressure, and the varying differences in temperature, been closely watched and studied by mining engineers, and valuable facts from time to time have been arrived at and collated. I have of late observed that at a longer or shorter period after the autumnal equinox, explosions of fire-damp occur in groups. Those disasters manifested themselves in a remarkable degree in 1866 and in 1867; and, when 1868 came round, its closing months were accompanied by continued storm, and in some places by earthquake, and, as in the two previous years, fearful explosions of carburetted hydrogen ensued. It is possible that hurricanes may have something more to do with the interruption of the ventilation of our pits than we are aware of; and moreover it is not irrational to suppose that geognostic phenomena may also affect our mines in some manner or other as yet entirely unknown to us.

Happily we know a little about the atmosphere that surrounds the globe, not only of its chemical composition, but also of its physical status. We know that it is liable to considerable variations in its density, from its maximum weight down even to comparative tenuity; and this natural alteration of specific gravity proves to be a most serious matter in carrying on safe and healthy ventilation. Such remarkable change in the air

is faithfully represented on the barometrical scale, ranging from as high as 30·60 inches in our latitudes, down even as low as 28·60 inches. Then again, the variation in temperature is most important, in fact thermometrical difference is the very source and essence of all furnace ventilation. It would then be supposed that persons engaged in colliery pursuits would very naturally be interested in those two important facts. But, at intervals (I am happy to say sufficiently rare), there are still met with those who have but little consideration for the simple instruments that record and indicate the above two important meteorological occurrences. No doubt this disregard of first principles had, to a certain extent, been observed by the late eminent Mr. Nicholas Wood, and was possibly one of the reasons why he so strongly urged that viewers should receive a higher order of education in connection with the Durham University. Than Mr. Wood, no one more highly appreciated the value of scientific instruction for those who wished to dedicate themselves to the important occupation of coal mining.

It is not mere familiarity with common instruments that constitutes scientific acquirement; the use of barometer, thermometer, anemometer, water-gauge, theodolite, circumferentor, and spirit level, is easily learned. But mining engineers should go far beyond that; the knowledge, to a very considerable extent, of geometry and mathematics, chemistry, physics, mechanics, geology, and mineralogy, is absolutely necessary.

With regard to the instruments already spoken of, I beg permission to say, that we do not at present know but that others may be required in mining. It is possible that the time may arrive when we may even come to the use of the seismometer underground, for earthquake is not altogether unknown in England. Or sound practical chemistry may some day be of advantage to us, for instance, tests for the detection of allotropic oxygen or ozone in coal mines. Though we are not all of us acquainted with delicate and intricate instruments and other philosophical apparatus, we are not therefore justified in proclaiming that they are positively valueless in colliery operations. There are properties in air of which we are even now in a state of ignorance, but which in time may still become known to us in such a manner as to suggest entirely new ideas. That remarkable periodicity of explosion of fire-damp which I have already pointed out as occurring in certain months of the year may hereafter become perfectly comprehensible to us, and other useful discoveries may be made by continued philosophical research.

The late lamented physicist and chemist Faraday, when pursuing his investigations on the magnetism of the constituents of the atmosphere, found that "oxygen in various "media was strongly attracted by the magnet; in coal gas, for example, it was power-"fully magnetic, whereas nitrogen was diamagnetic." At one period the question actually occurred to him whether or not he might be able to separate the oxygen of the atmosphere from its nitrogen by magnetic analysis. It is from great names like Faraday's that we must look for light and discovery; already much has been accomplished for and by science; and coal mining as well as other branches of industry will be sure in time to reap the benefit of all such research. In the meanwhile, that which we as practical men have to do, is to sweep the working places of our fiery collieries with abundant supplies of fresh vital air—there lies the maximum means of safety after all; if the air does not get to the back of the work, it is not worth while to go to the expense of producing it. Plenty of splits must be insisted on, rigid discipline should be established throughout the mine, and, as a last recommendation and repetition, we should never neglect the free use of the philosophical instruments that just at the moment belong to our extremely limited list or repertory.

The last subject on which I am required to speak is education amongst the mining classes; I have generally left it to the very close of the annual Report, simply because I have little to say on the matter. All that I can observe is, that schools seem to be found almost everywhere in the various districts, but I fail to recognize a corresponding improvement amongst the young people; at any rate I do not witness such progress as I earnestly wish to see,—and so, I suppose, education will remain in a suspended state, until means are adopted to render it compulsory.

I have, &c.
(Signed) Lionel Brough,
Inspector of Mines.

To the Right Hon. Henry Austin Bruce, M.P.,
Secretary of State for the Home Department,
&c. &c. &c.

LIST of the FATAL COLLIERY ACCIDENTS, and LOSS of LIFE arising therefrom, in the SOUTH-WESTERN DISTRICT, during the Year ending the 31st of December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868. Jan. 3	1	Mydylog -	Nantyglo -	J. and C. Bailey - -	George Nott -	Collier -	60	A "bell mould," as it is termed, fell from the roof and killed him. I satisfied myself by examination that it was altogether concealed from view, and that there was not a suspicion of it until it suddenly fell.	–	1	–	–	–
„ 7	2	Aberbeeg -	Pont Aberbeeg -	Webb and Spittle -	Isaac Barwell -	Collier -	30	This also was the fall of a "bell mould," which detached itself from the roof without notice; it weighed about 12 cwt.	–	1	–	–	–
„ „	3	No. 4 - -	Sirhowy - -	Ebbw Vale Co., Limited -	Henry White -	Collier -	48	A portion of the roof fell as he was endeavouring to get down some coal a little in advance. This poor man had carried on his stall in a most workmanlike manner.	–	1	–	–	–
„ 9	4	Dean Lane -	Bedminster -	Henry Bennett - -	John Towzer -	Collier -	31	The roof fell on him, but he could have got it down in safety if he had but kept under the timber.	–	1	–	–	–
„ 10	5	Bwlchygarn -	Beaufort -	J. and C. Bailey - -	Edward James -	Collier -	18	Killed instantaneously by a fall of "rashings," which, just there, came in under the true roof of the "elled" vein of coal. He should have kept those "rashings" cropped close to the face of work.	–	1	–	–	–
„ 15	6	New Bowson -	Forest of Dean -	Great Western Deep Coal Company, Limited.	Ed. Hooper -	Sinker -	30	Drawn over the pulley; there was probably some blundering about signals in this case.	–	–	1	–	–
								Carried forward - -	–	5	1	–	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward - -	–	5	1	–	–
Jan. 24	7	Tylery Colliery	Abertylery -	John Jayne - -	Jas. Blacker -	Collier -	18	The Elled vein of coal carries a good top, but all about the immediate neighbourhood where this youth lost his life a dangerous shale has come in, full of slips and joints. Several props were up, but still, as it turned out, not in sufficient number. With such roofs as this the managers must really insist on timber being set up wherever there is room for it, leaving, of course, space sufficient for the workpeople to operate.	–	1	–	–	–
„ 27	8	Brandybottom Colliery.	Pucklechurch -	Jefferis and Co. - -	Thos. Woodington	Collier -	40	A heavy stone fell from roof just where a diagonal slant or joint passed through the stratification. Died the day after having been injured.	–	1	–	–	–
Feb. 4	9	Cwmsychan Colliery.	Abersychan -	Ebbw Vale Co., Limited -	Daniel Evans -	Collier -	56	The stone that killed him fell from the roof of the "three quarter vein."	–	1	–	–	–
„ „	10	Foxesbridge Colliery.	Forest of Dean -	Barrett and Crawshay -	Hy. Fleetwood -	Collier -	14	Fell under a "cart," and was so severely injured that he died on the 16th.	–	–	–	1	–
„ 19	11	New Pit Colliery	Blaenavon -	Blaenavon Iron Company	Wm. Williams -	Road man -	25	A stone fell from roof whilst he was clearing a fall on the main level. The cause can only be attributed to two "slips" meeting together in a point or angle, and thus the mass was enabled to detach itself.	–	1	–	–	–
								Carried over - -	–	9	1	1	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost. Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward - -	–	9	1	1	–
Feb. 19	12	Tunnel Pit Colliery.	Ebbw Vale -	Ebbw Vale Co., Limited -	William James -	Stoker, underground.	24	The terrific gale on the mountain on that day suspended the ventilation for a short time, in consequence of their being scarcely any stack on the upcast shaft; then the products of combustion of the underground boiler fire backed and overpowered him.	–	–	–	1	–
„ 21	13	Tyr Phil Colliery	Rhymney -	Rhymney Iron Company -	John Jones -	Collier -	22	Hurt in the head by a fall of shale, and was so injured that he died on the 22d.	–	1	–	–	–
„ 22	14	Millfraenhill Colliery.	Brynmawr -	John Jayne - -	Samuel Perrott -	Collier -	58	The roof fell and killed him; he was requested just before to put up a prop, but refused, saying that he was satisfied that the place was safe.	–	1	–	–	–
„ 26	15	MardyPitColliery	Rhymney -	Rhymney Iron Company -	John Jones -	Collier -	18	Fall, whilst drawing away some coal at the bottom of a "slip."	–	1	–	–	–
Mar. 13	16	No. 15 Pit Colliery.	Ebbw Vale -	Ebbw Vale Co., Limited -	Wm. Davis -	Collier -	37	Injured on the 13th of the month by a fall of coal and clod in the face of his stall, and died on the 15th.	–	1	–	–	–
„ 21	17	Blaendare Colliery.	Pontypool -	Blaendare Co., Limited -	Thos. Short -	Collier -	30	Coal suddenly fell and killed him on the spot.	–	1	–	–	–
„ 23	18	Glyn Pit Colliery	Pontypool -	Ebbw Vale Co., Limited -	Jno. Watkins -	Haulier -	22	Fall of rubbish from the roof - -	–	1	–	–	–
„ „	19	Terrace Pit Colliery.	Rhymney -	Rhymney Iron Company -	Danl. McArthy -	Collier -	40	Whilst he was ramming the safety fuse the shot went off. It is supposed that he had in a blundering manner placed his light close to the shot hole, and so fired the fuse.	–	–	–	1	–
„ 24	20	Old Coal Pit -	Blaenavon -	Blaenavon Iron Co. -	Dd. Jenkins -	Collier -	25	A piece of clod from roof suddenly fell and killed him. The face of his work should have been "cropped."	–	1	–	–	–
								Carried over - -	–	16	1	3	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
								Brought forward - -	–	16	1	3	–
1868. April 3	21	Mells Colliery -	Frome - -	Stephen Steeds and Co. -	John Cary - -	Hitcher -	18	Hurt by cage commencing to descend instead of going up, whereby he was caught before he was well in. This happened, no doubt, in consequence of the onsetter at the extreme bottom having misunderstood the signals. The injured man died on the 13th.	–	–	1	–	–
„ 4	22	Glyn Pit Colliery	Pontypool -	Ebbw Vale Co., Limited -	Wm. Marshall -	Collier -	57	Killed in the rock vein coal whilst he was actually sounding the place to ascertain if it was safe or otherwise. The stone that fell was liberated from the top by its slanting structural division. A moment before his death he told his son that he considered the place safe.	–	1	–	–	–
„ 15	23	Cwmbran Colliery	Newport -	John Lawrence - -	Thos. Williams -	Door Boy -	11	Fall of roof in main road; but he had no right whatever to leave his door. I entirely disagree with the trappers going with the hauliers. A grime and a "slip" let the mass fall easily down, and, moreover, the place was all of a "squeeze," and the bottom "pucking."	–	1	–	–	–
„ 21	24	Twerton Colliery	Bath - -	F. & D. Brown - -	Jno. Clark -	Collier -	25	Killed by the flat wire rope breaking, and falling on Clark and another who were working in the bottom of the shaft under a weak scaffold.	–	–	1	–	–
May 4	25	Forge Pit Colliery	Nantyglo - -	J. & C. Bailey - -	Wm. White -	Collier -	40	Killed by heavy fall of roof - -	–	1	–	–	–
„ 8	26	No. 8 Pit Colliery	Ebbw Vale -	Ebbw Vale Co., Limited -	Wm. Brimble -	Collier -	16	Fall of top coal whilst filling a tram in the heading which he and his father were driving. After the coal fell an unseen "slip" became evident enough.	–	1	–	–	–
								Carried over - -	–	20	3	3	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
								Brought forward - -	–	20	3	3	–
1868. May 29	27	No. 9 Pit Colliery	Ebbw Vale -	Ebbw Vale Co., Limited -	Thos. Ashman -	Collier -	21	Fall of "bell mould," by which he was so severely injured that he died the next day.	–	1	–	–	–
June 6	28	Black Vein Colliery.	Risca - -	T. W. Rhodes - -	Hy. Kingston -	Collier -	43	Killed on the slope in consequence of fracture of draw-plate. There were plenty of safety stalls, but nevertheless he got overwhelmed by the rushing trams. He had that moment passed a safety hole, but no doubt his presence of mind was gone.	–	–	–	1	–
July 7	29	Deep Pit Colliery	Nantyglo -	J. & C. Bailey - -	Isaac Rees -	Collier -	50	Fall of coal caused by a "slip" -	–	1	–	–	–
,, 8	30	No. 2 Pit Colliery	Sirhowy -	Ebbw Vale Co., Limited -	Chas. Lloyd -	Haulier -	16	Whilst taking coal from the top of the pit he fell under a loaded tram.	–	–	–	–	1
,, 11	31	Trafalgar Colliery	Forest of Dean -	C. Brain and Sons -	Jas. Collins -	Collier -	15	He concealed some gunpowder, and it ignited in his pocket, burning him so severely that he died the next day.	–	–	–	1	–
,, 14	32	Paulton Engine Colliery.	Paulton -	William Evans and Co. -	Wm. Swift -	Collier -	29	Killed by overwinding, in consequence of the "load indicator" getting unobservedly deranged. He found he was going too high, and jumped out of the cage, and fell right down the shaft.	–	–	1	–	–
July 29	33	South Wales Colliery.	Cwm Tylery -	South Wales Colliery Co., Limited.	Rd. Jones - / Jno. Williams -	Roadman - / Haulier -	34 / 21	These men were employed to get down some top in a squeezed old road, and unfortunately they placed a tram on each side of them, so that in case of danger there was no escape whatever because of the narrowness of the road, then came the fall of roof. If there had been but one tram they could have escaped easily.	–	2	–	–	–
								Carried over - -	–	24	4	5	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward - -	–	24	4	5	1
Aug. 8	34	Tyr Phil Colliery	Rhymney -	Rhymney Iron Company -	Thos. Edmund -	Collier -	44	Fall of roof in stall, occasioned by a clayey joint or slant.	–	1	–	–	–
„ „	35	Howbeach Colliery.	Forest of Dean -	Blakeney Co., Limited -	Wm. James -	Collier -	26	Fall of stone from roof - -	–	1	–	–	–
„ „	36	Patch (open work)	Tredegar -	Tredegar Iron Company -	Wm. Newman -	Collier -	40	Fall of coal from face of open work -	–	1	–	–	–
„ 11	37	Cinderpit Colliery.	Beaufort -	J. & C. Bailey - -	Rd. Davis -	Collier -	68	Fall of roof at mouth of stall; he was striking the stone with a sledge, but in doing so he unfortunately disturbed a prop, and that caused the roof to fall.	–	1	–	–	–
„ 25	38	Deri Newydd Colliery, Cwm Bargoed.	Merthyr Tydfil -	Jones and Co. - -	Lewis Morgan -	Collier -	21	Fall of roof, occasioned by a "smooth slip."	–	1	–	–	–
„ 31	39	Old Vobster Colliery.	Bath - -	Stephen Steeds and Co. -	Mark Button -	Collier -	30	Explosion of fire-damp. Three other persons were burned with him, but he alone succumbed; he died on the 13th of September.	1	–	–	–	–
Sept. 17	40	No. 22 Pit Colliery.	Ebbw Vale -	Ebbw Vale Co., Limited -	Jno. Pritchard -	Collier -	63	Fall of roof over Elled coal - -	–	1	–	–	–
„ „	41	Upper Writhlington.	Radstock -	Writhlington and Huish Company.	Chas. Whittock -	Collier -	41	Fall of bell-mould shaped mass of roof -	–	1	–	–	–
„ „	42	Duck Pit Colliery	Forest of Dean -	Goold and Company -	Geo. Dobbs -	Collier -	40	Fall of piece of top on to the collar of a pair of timbers, and this wooden bar or collar struck him dead. There ought to have been plenty of "lagging" above the timbering.	–	1	–	–	–
Sept. 22	43	No. 8 Pit Colliery	Tredegar -	Tredegar Iron Company -	Wm. Biggs -	Collier -	56	Sudden fall of about three tons of coal whilst he was sitting down eating his dinner. A "slip" ran right up through the coal and top.	–	1	–	–	–
								Carried over - - -	1	33	4	5	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
								Brought forward - -	1	33	4	5	1
1868. Oct. 16	44	No. 9 Pit Colliery	Ebbw Vale -	Ebbw Vale Company, Limited.	Hy. Mitchell -	Collier -	20	Fall of "bell mould" from roof -	–	1	–	–	–
„ 19	45	Patch (openwork)	Tredegar -	Tredegar Iron Company -	Thos. Rowe -	Collier -	50	Fall of "overlie" in a coal and mine patch. The stuff that fell should have been "terraced" down from above, and not "undergone" at the bottom, as unfortunately it was really performed.	–	1	–	–	–
„ 22	46	Bryngwyn -	Bedwas - -	W. S. Cartwright -	David Jones -	Roadman -	40	Overwhelmed by water tank on the winning slope. Being the person appointed to look after the slope, and well knowing all its modes of action, he certainly should have exercised greater discretion by stepping aside at the right moment.	–	–	–	1	–
„ „	47	Llwynypwll -	Abergavenny -	Hafod Colliery Company -	Jno. Williams -	Collier -	65	Fall of roof over coal - -	–	1	–	–	–
„ 24	48	New Bedwellty	Tredegar -	Tredegar Iron Company -	Jno. David -	Collier -	35	Fall of stone from top close by the side of the gob; it broke right over a timber prop. Died on the 7th December.	–	1	–	–	–
Nov. 12	49	No. 4 Pit Colliery	Sirhowy -	Ebbw Vale Company, Limited.	Wm. Bevan -	Helper -	12	Trams crushed him to death as he was unhitching at top of slope. Too young for this sort of employment.	–	–	–	1	–
„ 13	50	New Bedwellty	Tredegar -	Tredegar Iron Co. -	Jno. Hogan -	Collier -	36	Fall of "clod" between two coals; he should have spragged the "holing."	–	1	–	–	–
„ 16	51	No. 6 Pit Colliery	Victoria - -	Ebbw Vale Company, Limited.	Jas. Blakemore -	Collier -	20	Fall of stone which dropped from between two "slips."	–	1	–	–	–
„ 19	52	Tunnel Pit Colliery.	Ebbw Vale -	Ebbw Vale Company, Limited.	Thos. Perkins -	Collier -	24	Fall of "big vein" coal in face of stall -	–	1	–	–	–
„ 23	53	Nelson Colliery	Forest of Dean -	Osmon Barrett - -	Aaron Harris -	Collier -	33	Fall of a portion of the roof partaking of the nature of a "bell mould."	–	1	–	–	–
								Carried over - -	1	41	4	7	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.
								Brought forward - -	1	41	4	7	1
1868. Nov. 26	54	Rock Vein Colliery.	Risca - -	T. W. Rhodes - -	Ed. Holmes -	Collier -	30	Fall of coal in consequence of his not putting in a punch prop.	–	1	–	–	–
„ 27	55	Clandown Colliery	Radstock -	Clandown Coal Company	Wm. Carter -	Collier -	30	Gunpowder explosion, by which they were so severely injured that W. Carter died on the 10th of December and D. Millard on the 14th. They were not justified in using the powder in coal; it was supplied to them to blast top with.	–	–	–	2	–
					Dd. Millard -	Collier -	20						
„ 30	56	Aberbeeg Colliery	Pont Aberbeeg -	Webb and Spittle -	Thomas Gibbs -	Door-boy -	12	Injured by trams on the 30th, and died on the 5th December.	–	–	–	1	–
Dec. 2	57	Black Vein Colliery.	Risca - -	T. W. Rhodes - -	Ed. Beddow -	Roadman -	26	A defective roller threw the set of trams off the rails, and crushed him so dreadfully that he died next day.	–	–	–	1	–
„ 10	58	Lightmoor Colliery.	Forest of Dean -	Henry Crawshay - -	Moses Chivers -	Fettler -	35	Killed by falling down the shaft from the rocky vein to the bottom, whilst clearing the plunger of mud. The stage on which he stood was small and insufficiently protected.	–	–	1	–	–
„ 15	59	Ty Trist Colliery	Tredegar -	Tredegar Iron Company -	Morgan Thomas -	Collier -	62	Fall of "engine coal" in his working place, whereby he was so injured that he died on the 22nd.	–	1	–	–	–
								Total - - -	1	43	5	11	1

List of Fatal Colliery Accidents—*continued.*

RECAPITULATION.

Total number of separate fatal accidents reported in coal mines in the year 1868 - 59
Total number of persons killed by those 59 separate accidents - - - 61

Whereof 1 death was occasioned by explosion of fire-damp.
„ 43 deaths were brought about by falls of coal and stone.
„ 5 „ took place in pit shafts.
„ 11 „ arose from miscellaneous causes underground.
„ 1 death happened on the surface.

Total - 61 deaths, as enumerated and described in the List.

COMPARATIVE TABLE OF THE LAST FOUR YEARS.

In 1865, 26 persons lost their lives by explosion of fire-damp; whilst, during the whole of the same year, the total number of deaths from all causes amounted to - - - - - - 82
„ 1866, 6 „ „ „ „ „ - 81
„ 1867, 6 „ „ „ „ „ - 71
„ 1868, 1 „ „ „ „ „ - 61

NON-FATAL ACCIDENTS IN COAL MINES REPORTED THROUGHOUT THE YEAR 1868.

Of these in all 106, attended with injury more or less to the persons employed, occurred in the various mining establishments of the district in manner as tabulated below :—

7	accidents	by fire-damp,	whereby	25	men and boys	were burned by explosion, or underwent contusion or fracture by its expansive force.
55	„	by falls of stone and coal,	„	56	„	suffered wounds, broken bones, or bruises.
5	„	in pit shafts,	„	5	„	met with serious bodily injury.
23	„	from miscellaneous causes,	„	24	„	had bones fractured, or otherwise became incapacitated for a time.
6	„	occurred on surface,	„	7	„	received injury in some way or other.
106	accidents,			117	persons more or less wounded or hurt.	

Some of the above are already restored to health and employment; some are still suffering; and others, perhaps, may not be able to pursue their avocations for the remainder of their lives.

LIONEL BROUGH,
Inspector of the District Collieries.

LIST of the FATAL IRONSTONE MINE ACCIDENTS, and LOSS of LIFE arising therefrom, in the SOUTH-WESTERN DISTRICT of GREAT BRITAIN, during the Year ended the 31st Day of December 1868.

Date.	No. of Accidents.	Name of Mine.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Roof and Ground.	In Shafts.	Miscellaneous.	Above ground.
1868. Jan. 15	1	Gellynawsaidd	Abersychan	Ebbw Vale Co., Limited	Jacob Jones	Miner	21	Fall of working ground on his head, crushing it into the floor of the mine.	–	1	–	–	–
Feb. 3	2	No. 5 Pit Mine Works.	Victoria	Ebbw Vale Co., Limited	Griffith Morris	Miner	68	Fall of clod in the face of his work	–	1	–	–	–
Mar. 19	3	No. 6 Pit Mine Works.	Victoria	Ebbw Vale Co., Limited	Job Ralph	Miner	45	Fall of mine (a ball) lying over coal	–	1	–	–	–
„ 26	4	Blackpin Mine Level.	Varteg	Partridge and Jones	Joseph Harris	Miner	12	Fall of stuff overhead in consequence of a "slant" running up to a large ball of mine.	–	1	–	–	–
Apr. 1	5	Spotted Vein Mine.	Victoria	Ebbw Vale Co., Limited	Hy. Habakkuk	Miner	67	Injured by fall of mine ground whilst holing on the 1st of the month, and died on the 4th. An unexpected "slip" brought the stuff down.	–	1	–	–	–
May 2	6	Garn Slope Mine Works.	Blaenavon	Blaenavon Iron Co.	Ed. Hall	Hitcher	25	He slipped and fell on the slope whilst the engine was in motion, and the rope carried him into contact with the drum. He died on the 8th.	–	–	–	1	–
„ 6	7	Red Vein Mine Works.	Victoria	Ebbw Vale Co., Limited	Rd. Moxley	Miner	19	He was drawing the top vein down, and that brought with it a portion of roof.	–	1	–	–	–
„ „	8	Mine Pit	Varteg	Partridge and Jones	Ed. Redman	Haulier	13	Whilst driving the horse and loaded tram up a "dip heading," he either fell under or was riding in front with his feet so near the ground as to be drawn in under the loaded tram; however, nobody was near him at the time, and the exact mode of his death remains unknown.	–	–	–	1	–
June 22	9	Coity Pit Mine Works.	Blaenavon	Blaenavon Iron Co.	Thos. Watts	Miner	52	Crush of tram in consequence of not "spragging" it as he was taking it down the slope. He was so injured that he died on the 29th.	–	–	–	1	–
								Carried forward	–	6	–	3	–

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.				
									Explosions.	Falls of Roof and Ground.	In Shafts.	Miscellaneous.	Above ground.
1868.								Brought forward - -	–	6	–	3	–
Aug. 4	10	Greenland Pit Mine Works.	Abersychan -	Ebbw Vale Co., Limited -	Charles Jones -	Miner -	40	Whilst ripping top he stepped back to avoid a fall of stuff, but unfortunately stumbled and fractured his skull; he died on the 6th of the month.	–	1	–	–	–
„ 12	11	Gantre Pit Mine Works.	Ebbw Vale -	Ebbw Vale Co., Limited -	Hy. Phillips -	Miner -	25	Fall of ground in the face of his working place.	–	1	–	–	–
Sept. 23	12	Engine Pit Mine Works.	Sirhowy - -	Ebbw Vale Co., Limited -	Jno. Price -	Miner -	31	Fall of ground in "long wall" working; the ground was "sconged" by the coal having been worked below.	–	1	–	–	–
Oct. 15	13	Patch (open Mine Work).	Tredegar - -	Tredegar Iron Co. -	Gwenllian Stagg -	Filler -	45	Fall of mine ground as she was filling a tram. There was a "slip" running right up through the stratification, and the ground should have been stoped down from above. I object to women undertaking such employment, as they cannot jump back as men can; it was the cause of her death in fact; female clothing is not adapted to such work.	–	1	–	–	–
Nov. 10	14	Black Pin Mine Level.	Ebbw Vale -	Ebbw Vale Co., Limited -	James Jones -	Contractor	60	Fall of roof in consequence of the trams getting off the plates, thus displacing timber, which brought the roof down. He was driving at the time.	–	1	–	–	–
„ 21	15	No. 3 Pit Mine Works.	Beaufort -	J. and C. Bailey - -	Jno. Swift - -	Miner -	30	Fall of stuff whilst working in a red vein stall. The ground was reticulated with "slips" and "slants."	–	1	–	–	–
Dec. 18	16	Mine Pit - -	Varteg - -	Partridge and Jones -	Caleb Carter -	Miner -	23	Whilst filling a tram with rubbish in the horse road near the face of his stall, the roof fell, and so injured him that he died on the 21st after undergoing amputation.	–	1	–	–	–
								Totals - - -	–	13	–	3	–

List of Fatal Accidents in Ironstone Mines—*continued.*

RECAPITULATION.

Total number of separate accidents in ironstone mines reported in the year 1868		16
Total number of persons killed by those 16 separate reported accidents		16
Whereof 13	deaths were occasioned by falls of stone and iron mine.	
„ 3	arose from miscellaneous causes underground.	
16	deaths, as enumerated and described in the List.	

Comparative View of the last Four Years.

In 1865, the total number killed in all the ironstone mines of the district, arising from every cause, amounted to		14
„ 1866,	„	14
„ 1867,	„	14
„ 1868,	„	16

List of the Non-fatal Accidents in Ironstone Mines reported in the Year 1868.

4 accidents occasioned by explosion of fire-damp,	whereby 5	persons were burned and bruised.
7 „ by falls of material,	„ 7	persons were injured.
9 „ occurred from miscellaneous causes underground,	„ 10	persons were severely hurt.
20 accidents.	22	persons injured.

These men and boys are for the most part progressing towards recovery ; but, as in coal works, should any death take place, such will be found in the next year's returns.

Lionel Brough,
Inspector of the District Ironstone Mines.

Mr. Baker's Report.

Report on the Inspection of Mines in the South Staffordshire and Worcestershire District, for the Year ended the 31st December 1868.—By James P. Baker, Esq.

Sir, Wolverhampton, February 27th, 1869.

I have once more the honour to transmit my annual Report as Inspector of Mines in the South Staffordshire and Worcestershire division.

The accompanying "list" exhibits 90 separate fatal accidents and 104 deaths, brought about in working the coal mines of this district during the year 1868, which, as will be seen from the statement given below, shows a slight decrease both in the number of fatal accidents and in the deaths resulting therefrom as compared with 1867, and also in comparison with the annual average loss of life for the seven years previous.

Total number of separate fatal accidents in the year 1867 - -	95
Total number of deaths by those 95 separate accidents - - -	111
Total annual average loss of life for the 7 years ending 1867 inclusive -	112·7

Comparat death rat

This statement shows no very remarkable decline in the annual average death rate of the last few years. Nevertheless, it is always a pleasing duty for an inspector of mines to be able to report a diminution in the rate of mining mortality, however small, and it cannot be less satisfactory to the operative miners themselves and the community at large. Speaking of this district alone there is much to be thankful for, seeing that the annual average death rate of the last eight years has been about 50 less than the annual average from 1850 to 1860 inclusive. It stood at nearly 200 per annum, at a time when there were fewer colliers by thousands employed, and hundreds of thousands if not millions of tons of coal less raised. Gratifying however as these results really are, there is still much room for improvement both above and in the underground management of our collieries, especially where the charter-master system prevails, to which I called attention both in my last and in former reports.

Average of the las eight yea

To further diminish colliery accidents in this district we want, in many instances, a more vigilant and competent supervision both above and below ground, not only at every colliery, but in every pit.

Complete immunity from fata accidents must not looked fo nor expec

Nobody will pretend to say that if this were efficiently carried out it would entirely prevent accident, nor, in my opinion, would complete immunity from mining fatalities be achieved if an inspector were appointed to every pit in the kingdom, for dangers seen and unseen are always more or less present in the mines, against which no human skill and foresight can at all times provide. The necessity for better supervision, however, will be apparent when some of the most serious accidents of the year are brought under notice.

Quantity coal raise

During the year, owing to the depressed state of the iron trade of this country, the consumption of coal has been somewhat lessened, but the confidential returns of colliery proprietors and agents enable me to state that no fewer than 9,900,000 tons of 2240 lbs. have been raised, including as usual the colliers allowance coal, colliery consumption and waste, which I again estimate at 1,300,000 tons. This is still a large output. The depressed condition of the iron trade does not affect the collieries now to the extent it did formerly, owing to the great facilities afforded by railways for the transport of coal to different parts of the kingdom, and the quantity required for the varied and increasing commerce of the country.

In the interest of the teeming population of this district whose occupations depend upon the continued supply of coal it is to be desired that the mineral resources of this coal field should be economized as far as possible, especially that portion of it which is practically and commercially applicable to the manufacture of iron. Considering the quantity annually raised the coal seams now available are very much nearer exhaustion than the trade and some of the people of the district seem to be aware of, or are, at any rate, willing to admit.

This question was mooted by me several years ago, and I briefly alluded to it in my Report of last year, and the opinions I then ventured to offer have been fully confirmed by the inquiries I have made during the past year.

The produce of some of the larger collieries is mainly sold for domestic use, and at a price far beyond that generally given by the iron trade. With the exception of these, scarcely any owners or agents to whom I have spoken have named so long a period for the duration of their collieries at their present rate of working as I was myself disposed to assign, and as the small and inferior collieries die out the demand will of course be greater on those that may still remain, and thus the calculations as to time will be proportionally shortened.

I wish it to be distinctly borne in mind that my observations apply chiefly to the iron trade of the district, and that I do not allude again to this subject to cause unnecessary alarm, but simply to keep it before the mining public, so that no further opportunity may be lost, either in thought or action, with a view to ascertain what available resources exist on the opposite sides of the great western and eastern faults of this coal basin.

It is to be regretted that excellent opportunities in our extreme east and west collieries at West Bromwich and Essington have already been allowed to slip by, where trials might have been commenced in the Permian Rocks at the respective depths of 400 and 200 yards. Such opportunities are rarely met with in this coal field, as depths from the surface, varying from four to six and probably eight hundred yards, might have been reached with suitable machinery, which would have gone far towards determining the question of the existence of coal in those localities.

Of the 104 fatalities which occurred during the past year, three were the result of explosions of fire-damp, 58 of falls of roof and coal, 21 of accidents in shafts, and 18 were owing to miscellaneous accidents underground, and four on the surface.

Fire-damp as usual stands first in the "list," and the number killed shows a very remarkable and satisfactory diminution, corresponding exactly with the number under this head in the year 1858.

The first of these cases, No. 40 in the list, was the result of the deceased's own disobedience to orders and indifference to danger. He was engaged thirling a headway, and when he himself thought he was near putting through, he incautiously, after being advised to the contrary, went into the head into which he was expecting every minute to thirl with a naked candle and fired a small quantity of gas, which injured him so severely that he died in a few days after the occurrence.

The other case, in which two persons were killed, No. 78, might have been attended with more serious consequences. Happily, however, the major part of the colliers were some distance away, and, with one or two exceptions, escaped both the blast and the after-damp, and got safe out of the mine.

One of the deceased men was the deputy manager underground, and had charge of the mine. On the morning in question he went with his lamp as usual to examine an opening or stall in which a quantity of coal had been thrown or got down by the miners overnight, and when he had arrived at the spot he called the other unfortunate man to bring him a "candle" and a "pick," but before he could reach him the explosion happened which nine days later terminated the existence of two fine and useful men.

On my examination of the pit after the accident I could not detect the presence of gas, and the ventilation was in every respect sufficient.

The fall of coal on the night before the accident had left a cavity in the roof of the stall which had been the working place of several miners up to within some two or three hours before the explosion, and which, nevertheless had, during the *interim*, filled with gas. This the deceased might have easily detected if he had understood its character, and the duties devolving upon a man placed in such a position. This case shows how the lives of the colliers are occasionally placed in the most imminent peril, and how they sometimes escape serious injury and violent death. As it was, all the men in the vicinity of the fire suffered more or less, but none except the two mentioned lost their lives.

At the inquest upon the bodies it was presumed from the evidence, and also the statements of the two men before death, that the deputy had neglected to examine the recently made cavity in the roof of the stall, and unscrewing the gauze of his lamp, exposed the flame, and hence the explosion, which is by no means improbable, unless the lamp, which by the way has not been found, was defective or injured during the examination. Of this, however, there was no evidence, and judging from the habits of many of our underground deputies, the former was in all likelihood the course pursued in this instance.

This view of the case affords an illustration of that want of competent supervision which I have already alluded to in this and former Reports, without which, and more

thoughtful care on the part of the miners themselves, I regret to have to say, that any considerable diminution in the loss of life amongst the operatives of our collieries in this inspection district is, I fear, almost hopeless.

Falls of Coal and Roof.

The deaths from this cause are two less than they were in the year previous, when 60 were recorded. This accidental mortality, as it is too often termed, still runs high, and will doubtless remain so till our underground discipline shall be greatly improved, on which, however, having previously called special attention to the subject, it is not at all necessary for me to enlarge.

As there are, with few exceptions, no entries under this heading in the list of an unusual character, I do not consider it necessary to give a detailed account of each case, inasmuch as the list itself contains a brief explanation of the time, place, and cause of death. I shall therefore only refer to those cases which appear to require special remark.

Of the 58 persons killed by falls of coal and roof, 6 were pikemen, who had neglected to sprag or spurn the coal whilst holing and cutting, or had improperly removed timber props.

Six lives lost which better dis cipline and more thoughtfu care wou in all pro bability h preventec

While men of this class, who, more than any other operatives employed underground, have both the time and the means for protecting themselves, remain so indifferent to their own safety, accidents, more or less fatal, are inevitable.

The special rules go far enough to prevent such neglect if only they are strictly enforced.

The Hilly Colliery accident, No. 38 in the "list," is a case of such reckless colliery management as never before came under my notice during the whole course of my experience.

The owners, Messrs. Nock and Potter, were formerly charter-masters in the district, and were at the time of the accident working this colliery in the top part of the thick coal. On the morning of the sad occurrence the stall, which contained a fall of coal, was duly examined and pronounced unsafe, owing, as one of the witnesses stated at the inquest, to the "rock-roof stirring;" in consequence, the loaders were sent into another side of work. After loading five or six skips the deceased and two more were ordered back by the deputy to load the coal in the dangerous stall, when, after the lapse of about three hours, the rock-roof, which was found "stirring" only a short time before, suddenly fell, nearly severing the head of the deceased from his body, whilst the trunk was shockingly mutilated.

How the dergroun workings sometime conducte and the result ari therefro

In this instance there was not, according to the witnesses at the inquest, a single stick of timber under the roof, nor any for use either in the pit or on the surface of the colliery; but, notwithstanding the evidence of one of the owners to the effect that the deputy's acts were improper, the jury returned a verdict of "accidental death."

Such a revelation of colliery management is a discredit to any mining district, and, I venture to think, goes far to confirm what both myself and predecessors have said and written on this subject.

The special rules were duly hung up at the colliery office, but had not been established in accordance with the Mines Inspection Act, consequently proceedings could not unfortunately be instituted for any violation of their provisions. Subsequently, however, and in compliance with the instructions of the then Secretary of State, proceedings were taken against one of the owners for neglecting to establish special rules in conformity with the provisions of the statute, and the case was eventually brought before the Oldbury bench, and the defendant fined 2*l.* and costs.

No. 63 occurred at the Rowley Hall Colliery. The charter-master, a worthy and excellent collier, on the morning in question descended the pit at an early hour, and in his over anxiety to start the "bond," decided to prop some coal which had been holed or under cut on the side of one of the gate-roads for the purpose of widening it. While he stood waiting for the timber to be brought, the coal suddenly fell upon him, inflicting injuries so severe that he died the same day at his own home, the sad result of too long delaying the timbering.

Falls of coal and roof frequently happen in thick coal mining, owing to a phenomenon technically called a "bump," caused by the subsidence of the superincumbent strata over large cavernous excavations of "pillar and stall" workings, which by the "long wall" system is by no means so frequently met with. About 25 per cent. of the deaths under this heading during the year are chiefly attributable to this cause, and so long as the pillar and stall mode of working continues deaths will, more or less, I fear, have to be

annually recorded. It is, however, gratifying to learn that in several instances the "long wall system" is now about to be commenced, an example which, so far as it can be carried into effect, will it is to be hoped be followed by "thick coal" colliery owners generally, as it is too well known in this district to require comment that the "long wall" mode of working the thick seams has highly contributed to the general produce per acre of ground worked, and most important of all, to the safety to life and limb of those employed therein.

Shaft Accidents.

These casualties are five in number more than they were in the year 1867, being an increase of about 25 per cent., due in a great measure to the accident which took place at one of the pits of the Cannock Chase Colliery on the 15th May last, and by which a larger number of persons were sacrificed than by any other single accident which happened in the district during the year. On the morning of the day on which the accident occurred, eight men and boys, the usual number allowed by the special rules, were descending the shaft when the "flat wire-rope" suddenly snapped, precipitating them to the bottom. Five were killed at the time, another, a youth of 16, died shortly after the accident, and two others recovered from the very serious injuries they sustained.

On examining the rope I found that at the point of fracture it had been covered for about 18 inches with hemp, which had become so hard and solid as to form a bolster on each side of the flat rope, about three quarters of an inch in thickness for two thirds of its length, tapering off towards the extremities. It appeared that the object of this very unusual application was, that the wrapping of hemp should act as a "token" to show the engineman when the skip was opposite a "headway or insett" where it had to stop. There was no indicator, which would have rendered any such rude and dangerous provision unnecessary. I found that only 25 or 26 wires, or about a *seventh* of the number composing the rope, were whole when the accident occurred. The hard and solid wrapping of hemp no doubt caused the wires to break, as in passing over the periphery of a five-foot pulley, and then under the drum which was of similar diameter, it bent the rope to and fro at different angles, gradually breaking the wires, until those remaining, which had themselves become weakened, suddenly snapped. Not only was this "token" the cause of the rope breaking, but it had the further effect of preventing the discovery of its gradual destruction. The special rules require the periodical examination of the ropes, but this was impossible unless the hemp, which had been on for three or four months, had first been removed. Mr. M'Ghie, the manager for the company, acknowledged at the inquest that it was improper to place tokens of this kind upon ropes, that they would have an injurious effect, and would prevent any effective examination; and he was of opinion that the fracture of the wires at the point of severance had been going on for three weeks or a month before the accident, and could have been discovered but for the wrapping of hemp.

Hargreaves Walters, the colliery engineer, was perfectly aware of the token having been put upon the rope by the engineman, but never supposed that it would injure the rope, and never had it removed for the purpose of examination.

The jury, after a long consultation, agreed to a verdict of "accidental death," but censured the engineman for putting on the token, and the manager, Mr. M'Ghie, and the colliery engineer, Walters, for not having had it removed.

In pursuance of instructions which I had the honour to receive from the then Secretary of State, Mr. M'Ghie was summoned for not having provided an indicator, and for two other infractions of the law. He pleaded guilty, and was fined by the magistrates, Boaz Bloomer, Esq., an iron and coal master in the same district, and John E. Bealey, Esq., 10*s.* and costs in each case; a very light penalty, considering that the provision of an indicator would, according to the statement of the engineman, have rendered unnecessary the use of the token, from which this dreadful accident clearly resulted. The absence of an indicator and of the other apparatus required by law is the more to be wondered at as generally the colliery ranks amongst the best appointed in the district.

Besides those killed at Cannock Chase, 15 lost their lives from various causes at other collieries in the district, making the total number in shafts 21, and of these four fell from the surface, all of whom might have been saved by the adoption of what is termed a "travelling fence," a provision I first called attention to in my annual Report of 1865. I know of no other apparatus of the kind for open working shafts, and this is simple, safe, and inexpensive. It is therefore to be regretted that the owners and agents, with few exceptions, are so slow and apparently so unwilling to adopt it. In the event of any

alteration in the law for the better regulation and inspection of mines, I cannot too strongly recommend the insertion of a clause which shall render compulsory the use of this or some similar apparatus.

Accident No. 28 shows disregard of the special rules and great indifference to danger alike by the deceased and the charter-master. The former had finished his work as a pikeman in a level which was being driven in a lower measure, and whilst ascending the shaft on the "band or coupling chain" his head came into contact with the scaffold, he fell, and was killed. It appeared that the charter-master stood on the scaffold at the time to guide him through the aperture, though he knew that such a mode of raising men is strictly prohibited by the rules, and that provision should have been made for the free passage of the tackled skip. The jury, at the inquest upon the body, returned a verdict of "accidental death."

The agent of the colliery, however, immediately summoned the charter-master before the magistrates at Dudley for a violation of the 23d special rule and he was fined 10*s*. and costs.

There was a very unusual accident at the Brierley Colliery, No. 31 on the list. The unfortunate deceased, the charter-master, was descending the shaft with another man when the skip lodged on a "biatt," which had been floated out of an upper "level." The water had left one end resting in the level and the other on the walling of the shaft. This unexpected obstruction caused the skip to *cant* and the unfortunate man to relax his hold of the tackle and fall to the bottom. He lingered on till next day, when he died of the injuries sustained by the fall. The other man held firm hold of the tackle and was saved. This is another instance of death which might have been avoided by using the safety-chain.

One life, No. 43 in the list, was lost through overwinding.

How fatal accidents sometimes unfortunately happen through negligent enginemen

In this instance the charter-master was descending the shaft, and when within a few yards of the bottom he stopped to repair the water-pipes. He afterwards gave the signal to ascend, which was duly observed, but the engineman neglected to stop his engine at the right place, and drew the unfortunate man over the pulley, by which he was fatally injured and died next day.

The engineman's only plea at the inquest was that, in consequence of the deceased not going to the bottom of the shaft, the "bell" attached to the "indicator" did not ring as usual, and therefore deceived him, which on investigation I found to be correct. This, however, was no answer to the charge of neglect, as the indicator itself should have been his guide and not the "bell."

The engine was under easy control, so much so that without the aid of the break the "band" could be regulated to an inch or so, in point of fact, for an engine and winding gear of that class, there was nothing to complain of.

Result of t verdict of manslaugh ter against the engine man.

Evidence to that effect was given before the coroner at the inquiry, at the close of which the jury returned a verdict of manslaughter against the engineman. The bill of indictment, however, was ignored by the grand jury at the Stafford Midsummer Assizes, though this was one of the clearest and grossest cases of overwinding through neglect that has come under my notice.

No. 80 in the list occurred to a lad who, whilst attempting to cross over the "sump," fell through the scaffold, owing to the absence of one of the "planks," which contrary to the special rules the deputy manager had permitted to be removed, and hence the accident and subsequent death of the unfortunate youth.

In accordance with your instructions the deputy was afterwards summoned before the Stourbridge magistrates, and the full penalty of 40*s*. and costs was imposed.

Eighty-eight in the list, and the last requiring any special notice, occurred at the Ettingshall Colliery, belonging to H. B. Whitehouse, Esq.

The pit in question was at that time in the possession of and worked by a charter-master named, Jackson, who, it appeared, on the morning of the accident did not as usual reach the pit in time to arrange with and see the workmen descend. The deputy, however, took the workmen down the pit and commenced operations, leaving two "boys" under 15 years of age in charge on the pit bank, contrary to the provisions of the statute.

During the morning of the day on which the accident occurred, as these "boys" were engaged at the mouth of the pit-shaft, the gin-driver, and the younger of the two, fell down the shaft and was killed; the sad result of leaving *children* in charge of such important and dangerous work.

In obedience to your commands the charter-master, Jackson, has since been summoned before Isaac Spooner, Esq., and fined the minimum penalty of 20*l*. and costs.

Miscellaneous Accidents.

An accident under this heading, 23 in the list, caused the loss of five lives out of the 18 classed under this heading, and only one less than the Cannock Chase catastrophe. It took place at the Clattershall Colliery on the 11th of March, and furnishes a striking proof of the looseness and disregard of general directions which is often exhibited in the mines of South Staffordshire. The workings were old and somewhat extensive, and a portion of them, which were on fire, was cut off from the part in which coal was being got by "dams" built across the air-course. Ventilation was secured by a lamp-fire in the up-cast shaft, and Mr. Groucutt, the colliery manager, had given Shaw, the charter-master, strict orders to keep up this fire constantly, leaving him no discretion in the matter. One of the fire dams which was near the up-cast shaft leaking, the charter-master directed his deputy, a man named Chivers, to repair it by placing sand against it, and told him to lower the sand by the winding or downcast shaft, and to convey it thence to the dam. Chivers, however, insisted that this was a needless trouble, and proposed to take out the lamp-fire and throw the sand down the up-cast shaft, and Shaw, after some dispute, yielded to his wishes. The result was that Chivers and four others lost their lives by an accumulation of "choke-damp."

Shaw, the charter-master, was committed by the coroner's jury for "manslaughter," but on being tried at the assizes at Stafford was acquitted.

Carbonic acid gas proved fatal to a boy employed at the Willenhall Road Colliery. This case stands No. 2 in the list. At the pit in question a headway was being driven towards another shaft, and was ventilated by sheet-iron tubing attached to a fan on the surface.

On the morning of the accident, the man in charge of the mine took the deceased and another boy down the pit, and on his examination of the headway he found a little gas at the far end of the drift. He at once went back to the pit bottom to give orders for the fan to be driven faster. Meanwhile, however, he sent one of the boys to fetch a tool which he had left by the side of the burning candle not far from the gas, telling him at the same time not to go beyond the candle. As the boy did not quickly return, the second boy was sent after him, who immediately came back to the man at the bottom, saying that "he could not bring the deceased out as he had gone beyond the candle and was got down by the damp." The man went at once to his rescue, and might have saved him, but he was too great a coward to make the attempt, and allowed the poor boy to perish before his face, which might have been avoided by timely assistance, as the gas did not prevent another man rushing into the place in the hope of bringing the boy out alive, a noble act, which, however, was unfortunately performed too late.

It was decidedly wrong and cruel in the first instance to send the boy into such a place at all, and much worse to stand by and witness his death without making any attempt to effect his rescue. Such persons are totally unfit to be intrusted in any way either with the care of mines, or the persons employed therein.

Accidents, No. 17, 18, 21, and 76 were brought about from the timber settings giving way, either from "bumps," superincumbent weight, or lateral pressure, which generally speaking, causes the settings to reel and eventually slip out, thus allowing the "gobbing" or "loose coal and dirt" to rush down, burying everything and smothering everybody who may unfortunately happen to be under at the time.

Whenever more than one setting of timber is erected, they should be so fastened together as to prevent the trees or props from reeling or slipping out, a precaution which I have never ceased to impress upon the minds of underground managers.

Another case of suffocation, 82 in the list, happened at one of Lord Dudley's old rib and pillar pits in the Wallows Colliery. This mine has for some time past been more or less subject to spontaneous fire, and has been a source of much anxiety and trouble to the agents, in checking its continual ravages and encroachments on the solid coal.

When indications of its presence appear, it is customary to erect dams in the "bolt holes" and headways, and it very frequently requires a temporary stoppage of the entire works.

In this instance "dams" had been built in the headways to prevent the spread of the fire during the absence of the workpeople from Saturday night till the Monday morning following. On resuming work the deceased with several others, including the charter-master, succeeded in removing one of these dams, but in making an attempt to reach the second he was overcome and suffocated by the gases given off through the pores of the dam and fractured coal.

Evidence was given at the inquest that the charter-master and several other workmen, including the deceased man's brother, were within a few yards of him, and seeing that he did not instantly return they followed and discovered his body, but were afraid to snatch him out, and thus he was left to perish in the vitiated air, and some considerable time elapsed before his body was recovered. It was also stated at the inquest that the unfortunate man was cautioned not to go beyond a point where his candle ceased to burn, which statement his brother corroborated.

Had the charter-master possessed a competent knowledge of the deadly nature of these gases he would never have permitted this man to have run such a risk.

Four deaths were caused by accidents on the surface, one by machinery, one by the bursting of a boiler, one on a railway, which should hardly perhaps have been classed amongst mining accidents, and the fourth was the case of a boy run over by a loaded tub. With regard to the boiler explosion (52 in the list) at the Brierley Colliery, the boy who lost his life was not employed there at the time. This death, however, is included in the list. From my examination of the boiler it appeared evident that its bursting was due to over-pressure, and in all probability shortness of water.

Considering the very large number of steam boilers employed in this district these accidents I am happy to say are of comparatively rare occurrence.

Convictions.

Proceedings for infractions of the law have been less numerous than in 1867. The fines imposed amount in the aggregate to 70*l.* 17*s.* 6*d.*

	£	*s.*	*d.*
The Worcester and County Banking Company, Cricket Field Colliery	30	0	0
Mr. Richmond, Bromley Lane Colliery, owner	30	0	0
Mr. M'Ghie, Cannock Chase Colliery, manager	1	10	0
Mr. Davis, Beechdale Colliery, owner	3	0	0
Mr. Watkis, Meadows Colliery, charter-master	0	5	0
Mr. Owen, Brownhills Colliery, charter-master	0	2	6
Mr. Nock, Hilly Colliery, owner	2	0	0
Mr. Bloomer, Sneyd Lane Colliery, owner	1	0	0
Mr. Turner, Whimsey Colliery, owner	1	0	0
Mr. Townsend, Whimsey Colliery, owner	2	0	0
	£70	17	6

Besides these, there have been several informations laid by the owners or agents of collieries against their workpeople which have resulted in convictions, and the penalties will no doubt in due course be paid over to the proper authorities.

Ironstone Mines.

During the year 1868 eleven separate fatal accidents have occurred in these mines, which resulted in as many deaths, being an increase of three over the previous year. They were less, however, than in 1866.

Six were caused by falls, three in shafts; one is classed as miscellaneous underground, and one on the surface. The general observations with regard to accidents in coal mines equally apply to these, which are sufficiently described in the list. One case, however, worthy of special mention, occurred at the Netherton Colliery of Messrs. Grazebrook, and affords a remarkable instance of reckless carelessness by one of the workmen named Thomas Pritchard. He was carrying to the pit top some timber props for use in the mine, and, whether by accident or intention, threw one down the shaft, which, striking the hooker-on at the bottom, killed him on the spot.

The jury at the inquest returned a verdict of manslaughter, and pleading guilty at the Worcester assizes he was sentenced to two months imprisonment with hard labour.

Several persons have as usual lost their lives who were not in any way employed at the collieries of the district, and have therefore no place in the list. At Brownhills a boy seven years old was improperly allowed to ride on the trucks of a tramway, fell off, and was killed.

In another instance a youth went to one of the pits at the Bradley Lodge Colliery, jumped into the skip in the absence of the banksman, and descended with another boy

He went into the workings, and no one being there to prevent him, ran about the mine, when he was killed by a fall. Again, several lads were playing on one of the pit banks of the Willenhall Road Colliery, when one of them ran to the balance chain, and sliding down a few yards, at length fell to the bottom and was killed.

I have, &c.

(Signed) James P. Baker.

To the Right Hon.
Henry Austin Bruce, D.C.L., M.P.,
Secretary of State, Home Department,
London.

List of the Fatal Colliery Accidents, and Loss of Life arising therefrom, in the South Staffordshire and Worcestershire District, during the Year ending 31st December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Jan. 1	1	Wall End -	Bloxwich -	R. Thomas - -	J. Flynn - -	Bondsman -	—	Fall of coal from a "slip" on the side of a gate road.	–	1	–	–	–	1
„ 6	2	Willenhall Road	Wolverhampton	J. Edge and Co. - -	S. Bellingham -	Collier boy	—	Suffocated by carbonic acid gas -	–	–	–	1	–	1
„ 7	3	Pool Meadow -	Willenhall -	Chillington Company -	W. Hill - -	Bondsman -	50	Fall of new-mine coal, which deceased had neglected to timber.	–	1	–	–	–	1
„ 10	4	Cannock and Rugeley.	Rugeley -	Cannock and Rugeley Colliery Company.	P. Loach - -	Collier -	20	Run over by railway truck -	–	–	–	–	1	1
„ 11	5	Trentham -	Willenhall -	Trentham Colliery Company.	R. Wynne -	Pikeman -	50	Fall of coal whilst holing in new mine coal; injured on the 9th instant, died this day. Had neglected to sprag.	–	1	–	–	–	1
„ 15	6	Keeling -	West Bromwich	H. Wythes -	D. Mills -	Collier boy	14	Fell down pit shaft - - -	–	–	1	–	–	1
„ 16	7	Homer Hill -	Stourbridge -	S. Evers and Sons -	E. Dowling -	Bondsman -	—	Fall of coal in thick coal pit -	–	1	–	–	–	1
„ 20	8	Tividale Hall -	Dudley - -	S. Bradley - -	J. Davies -	Ditto -	48	Fall of coal in thick coal pit from between 3 slips, the result of a "bump."	–	2	–	–	–	2
					J. Sperrings -	Ditto -	15							
„ 21	9	Prince of Wales	Ditto - -	Taylor and Davies -	J. Bull and another - -	Pikeman -	38	Fall of overhanging coal in thick coal pit, the result of a "bump" which knocked the timber out. Injured on the 20th, died this day.	–	2	–	–	–	2
							34							
„ 22	10	Brereton -	Rugeley -	Earl of Shrewsbury -	H. Sleigh - -	Ditto -	64	Fall of coal from the face on the 17th; died this day.	–	1	–	–	–	1
„ „	11	Cannock Chase	Lichfield -	Cannock Chase Colliery Company.	R. Hicken -	Collier boy	—	Crushed between tubs - -	–	–	–	1	–	1
„ 28	12	Old Park -	Dudley - -	Earl of Dudley - -	S. Jones - -	Bondsman -	24	Fall of coal in thick coal pit from a slip.	–	1	–	–	–	1
„ „	13	Kitsfield -	Deepfield -	J. Bryan - - -	D. Timmins -	Banksman -	—	Fell into pit shaft - - -	–	–	1	–	–	1
								Carried forward -	–	10	2	2	1	15

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	–	10	2	2	1	15
Feb. 29	14	Whitehall -	West Bromwich	J. Kendrick - - -	J. Didcote -	Sinker -	—	Whilst doing repairs in pumping pit, a setting of brickwork slipped out, and precipitated deceased down the shaft.	–	–	1	–	–	1
,, 30	15	Corbyn's Hall -	Kingswinford -	W. Beardmore and Co. -	G. Williams -	Bondsman -	34	Fall of coal in thick coal whilst removing timber.	–	1	–	–	–	1
,, 31	16	Foxyards -	Tipton - -	Earl of Dudley - -	W. Gibbons -	Pikeman -	24	Was attempting to get down some "stone coal" when it suddenly fell and killed him on the spot.	–	1	–	–	–	1
Feb. 7	17	Bradley -	Bilston - -	J. Bagnall and Sons -	T. Ellis - -	Bondsman -	51	Deceased was removing slack from under a large piece of coal, when it rolled over and displaced the timber settings under the roof, a portion of which fell, and killed him.	–	–	–	1	–	1
,, 29	18	Bourne Hill -	Rowley Regis -	Messrs. Nock - -	J. Dudley - / W. Morris -	Bondsman - / Ditto -	16 / —	Suffocated by a fall of loose coal and dirt caused by a "bump" which forced the timber settings out.	–	–	–	2	–	2
Mar. 2	19	Highfields -	Bilston - -	Barbor's Field Company -	S. Whitehurst -	Bondsman -	—	Injured by fall of roof on the 2d January; died this day.	–	1	–	–	–	1
,, 6	20	Ketley	Kingswinford -	W. Beardmore and Co. -	J. Pugh - -	Ditto -	47	Fall of coal in thick coal pit; whilst removing timber.	–	1	–	–	–	1
,, 9	21	Coneygree -	Tipton - -	Earl of Dudley - -	J. Sherwood -	Collier boy	15	Suffocated by fall of slack in gate road owing to the timber settlings reeling out.	–	–	–	1	–	1
,, 11	22	Tipton Moat	Ditto - -	Tipton Moat Colliery Co.	J. Jephson -	Pikeman -	28	Fall of rock in gate road, brought about by an improper removal of timber.	–	1	–	–	–	1
,, ,,	23	Clattershall -	Brierley Hill -	E. Bowen - -	J. Chivers and 4 others -	Deputy -	—	Suffocated by carbonic acid gas -	–	–	–	5	–	5
								Carried forward -	–	15	3	11	1	30

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	–	15	3	11	1	30
Mar. 11	24	Salt Well -	Netherton -	Earl of Dudley - -	B. Robinson -	Bondsman -	22	Fall of white coal in thick coal-pit. Too high to be practically supported with timber.	–	1	–	–	–	1
„ 13	25	Hange -	Oldbury -	Messrs. Round - -	D. Barratt -	Collier boy	—	Fall of coal in thick coal pit from between two slips caused by a "bump."	–	1	–	–	–	1
„ „	26	Cannock Chase	Lichfield -	Cannock Chase Colliery Company.	H. Watkins -	Horse-driver	—	Kicked by the horse he was driving on the 12th ; died this day.	–	–	–	1	–	1
	27	Withymoor -	Netherton -	W. H. Dawes - -	R. Perkins -	Collier boy	14	Fall of coal in brooch coal mine, the result of a sudden and unexpected subsidence of the supercumbent strata.	–	1	–	–	–	1
April 9	28	Salt Well -	Ditto - -	Earl of Dudley - -	J. Danks - -	Pikeman -	40	Whilst improperly ascending on the foot hook of the band chain he fell, and was killed.	–	–	1	–	–	1
„ 18	29	Old Park -	Kingswinford -	Ditto - - -	R. Aston -	Ditto -	40	Premature explosion of a shot; brought a fall of coal down upon him.	–	1	–	–	–	1
„ 26	30	Homer Hill -	Stourbridge -	S. Evers and Sons -	J. Wood - -	Ditto -	–	Injured by fall of coal on the 18th ultimo ; died this day. The sad result of neglecting to sprag the coal whilst holing in thick coal pit.	–	1	–	–	–	1
May 4	31	Brierley -	Coseley - -	J. Yardley - -	S. Beddow -	Charter Master.	61	Fell out of a skip whilst descending	–	–	1	–	–	1
„ 8	32	Hinley -	Kingswinford -	Earl of Dudley - -	S. Flavel - -	Deputy -	45	Fall of coal whilst removing a cog, in thick coal pit.	–	1	–	–	–	1
„ 15	33	Cannock Chase	Lichfield -	Cannock Chase Colliery Company.	T. Richards and 5 others.	Colliers -	40	Whilst descending the wire rope snapped.	–	–	6	–	–	6
								Carried forward -	–	21	11	12	1	45

List of Fatal Colliery Accidents—*continued*.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	–	21	11	12	1	45
May 18	34	Bradley -	Bilston -	G. B. Thorneycroft and Company.	I. Whittle -	Hanger-on -	15	Grasped the foot hook of the "band chain" for amusement, and rode up shaft several yards, let go, fell, and was taken up dead.	–	–	1	–	–	1
„ 22	35	New Brownhills	Brownhills -	Conduit Colliery Company	J. Robinson -	Collier boy	13	Crushed by a "tub" on the 16th instant; died this day.	–	–	–	1	–	1
„ 27	36	Barn Farm -	Darlaston -	S. Speake - -	W. Mathews -	Bondsman -	—	Fall of rock in gate-road whilst improperly drawing timber props which deceased had been cautioned not to interfere with. He, however, still persisted in their removal and lost his life.	–	1	–	–	–	1
June 3	37	Fly - -	Corngreaves -	New British Iron Company.	W. Piper - -	Deputy -	43	Fall of coal in thick coal pit, the result of removing timber props.	–	1	–	–	–	1
„ 15	38	Hilly - -	Oldbury -	Nock and Potter - -	E. Smith - -	Bondsman -	—	Fall of roof in thick coal pit opening	–	1	–	–	–	1
„ 26	39	Lower Moor -	Brierley Hill -	E. Cooper - -	H. Watts - -	Ditto -	57	Injured by a fall of overhanging coal which he was trying to get down on the 12th instant; died this day.	–	1	–	–	–	1
„ 28	40	Wood Farm -	Bloxwich -	Jeavons and Mitchell -	H. Garattley -	Pikeman -	—	Explosion of fire-damp on the 16th instant; died this day.	1	–	–	–	–	1
July 1	41	Millfield -	West Bromwich	T. Millership - -	E. Millership and son of the owner.	Assistant Manager.	24	Fall of roof from between two slips not previously seen.	–	1	–	–	–	1
„ 4	42	Tividale Hall -	Dudley - -	S. Bradley - -	H. Harrington -	Bondsman -	48	Fall of coal in thick coal; caused by a "bump."	–	1	–	–	–	1
„ 7	43	Capponfield -	Bilston - -	D. Jones and Sons -	W. Jones - -	Charter Master.	54	Overwinding. Injured on the 6th; died this day.	–	–	1	–	–	1
„ „	44	New Bearmoor	Cradley - -	New British Iron Company - - -	J. Granger -	Bondsman -	40	Fall of coal in thick coal mine - -	–	2	–	–	–	2
					H. Bywater -	Ditto -	—							
								Carried forward -	1	29	13	13	1	57

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	1	29	13	13	1	57
July 9	45	Wallows - -	Brierley Hill -	Earl of Dudley - -	J. Batham -	Pikeman -	28	Having drilled a hole for a shot, he was in the act of reaching the powder to charge it, when the coal suddenly fell upon him.	–	1	–	–	–	1
„ 10	46	Fishley -	Pelsall - -	Fishley Colliery Company	T. Onions -	Bondsman -	38	Fall of roof, the result of insufficient timbering.	–	1	–	–	–	1
„ 11	47	Black Waggon	West Bromwich	P. Williams and Company	T. Whitehouse -	Collier boy	—	Crushed by a skip - - -	–	–	–	1	–	1
„ 12	48	Blowers Green	Dudley - -	B. Cartwright - -	T. Cooper -	Bondsman -	30	Injured on the 3d instant, by fall of coal; died this day.	–	1	–	–	–	1
„ 25	49	Fullwoods End	Coseley -	D. Smith and Co. -	J. Huteley -	Pikeman -	65	Injured by fall of roof in gate road of a thick coal pit on the 17th instant, brought about by a "bump," died this day.	–	1	–	–	–	1
„ 29	50	Eagle or Springfield.	West Bromwich	Eagle Colliery Company -	D. Venables -	Collier boy	14	Fall of coal in thick coal pit, which was forced off a pillar by a "bump."	–	1	–	–	–	1
Aug. 14	51	Moxley -	Bilston - -	S. Groucutt and Co. -	S. Tonks - -	Pikeman -	36	Fall of coal - - -	–	1	–	–	–	1
„ 17	52	Brierley -	Bilston - -	J. Yardley - -	J. Shaw - -	Collier boy	14	Explosion of a boiler - -	–	–	–	–	1	1
„ 21	53	Fullwoods End	Coseley - -	Messrs. Turley - -	G. Oliver - -	Hanger-on -	15	Whilst improperly standing in pit bottom he was struck on the head and killed. Too young for such employment.	–	–	1	–	–	1
„ 22	54	Wallows - -	Brierley Hill -	Earl of Dudley - -	J. Rowland -	Pikeman -	41	Fall of coal from side of a pillar in thick coal pit, caused by a "bump."	–	1	–	–	–	1
								Carried forward -	1	36	14	14	2	67

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List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	1	36	14	14	2	67
Aug. 28	55	Salt Well -	Netherton -	Earl of Dudley -	M. Buttler - -	Bondsman -	40	Fall of a very small piece of white coal in thick coal pit. The injury seemed so slight that the deceased walked most of the way towards his home. He however, when within a short distance of his residence, fell down insensible and expired same day.	–	1	–	–	–	1
Sept. 9	56	Cotsal - -	Corngreaves -	New British Iron Company	W. Jones - -	Pikeman -	—	Injured by fall of coal in a thick coal pit whilst cutting a back spurn out on the 7th instant; died this day.	–	1	–	–	–	1
„ 15	57	Spring Vale -	Bilston - -	Union Coal Company -	W. Ray - -	Bondsman -	52	Fall of coal in fire-clay coal pit, knocked timber out.	–	1	–	–	–	1
„ 23	58	Black Heath -	Rowley Regis -	A. H. Dawes - -	W. Sheppard -	Pikeman -	40	Fall of coal in thick coal pit, the result of a "bump," which forced the timber out of its place.	–	1	–	–	–	1
„ 26	59	Himley -	Kingswinford -	Earl of Dudley - -	T. Smith - -	Bondsman -	39	About two tons of fallen coal rolled over *en masse* and crushed him to death in thick coal pit.	–	–	–	1	–	1
Oct. 8	60	Moat - -	Tipton - -	Tipton Moat Colliery Company.	J. Thomas - -	Ditto -	—	Injured by fall of roof on the 2d of April; died this day.	–	1	–	–	–	1
„ 14	61	Spring Vale -	Bilston - -	Union Coal Company -	T. Arnold -	Assistant Deputy.	42	Fall of coal, the too frequent result of neglecting to timber.	–	1	–	–	–	1
„ 21	62	Himley -	Kingswinford -	Earl of Dudley - -	W. Greenway -	Bondsman -	23	Fall of "stone coal" (150 lbs.) from off the side of a cog about 6 feet high.	–	1	–	–	–	1
„ 23	63	Rowley Hall -	Rowley Regis -	Wright and North -	A. Latham -	Charter master.	42	Fall of overhanging coal in gate road, thick coal pit.	–	1	–	–	–	1
								Carried forward -	1	44	14	15	2	76

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	1	44	14	15	2	76
Oct. 23	64	Shut End New	Dudley - -	Messrs. Cochrane -	E. Bytheway -	Pikeman -	29	Injured by fall of coal in thick coal pit on the 10th instant; died this day.	–	1	–	–	–	1
„ 27	65	Spring Vale -	Bilston - -	Union Coal Company -	W. Taylor -	Ditto -	36	He was cutting "tops" in a bottom coal pit, which he had not took the precaution to prop with timber.	–	1	–	–	–	1
„ 28	66	Groveland -	Dudley Port -	J. Bagnall and Sons -	R. Cooper -	Collier boy	15	Crushed to death by a skip -	–	–	–	1	–	1
„ 30	67	Himley -	Kingswinford -	Earl of Dudley - -	J. Oakley - -	Pikeman -	34	The deceased, the charter-master, and the deputy were trying to throw some over-hanging coal with "levers," when, suddenly and unexpectedly, a mass of "brazils" fell, killing Oakley, and injuring the other two men. Thick coal pit.	–	1	–	–	–	1
„ „	68	Salt Well -	Netherton -	Earl of Dudley - -	C. Bridgwater	Bondsman -	17	Injured slightly by a fall of "patchels" in thick coal pit on the 29th instant; died this day.	–	1	–	–	–	1
Nov. 4	69	Conduit -	Brownhills -	Conduit Colliery Company	J. Brindley -	Engineer -	34	Deceased and another were engaged changing the "bucket" in the pumping and winding pit, when the chain which suspended the "bucket-door" snapped and precipitated Brindley to the bottom.	–	–	1	–	–	1
„ 11	70	Withymoor -	Rowley Regis -	Messrs. Nock - -	W Barnett -	Labourer -	38	Fell into pit shaft - - -	–	–	1	–	–	1
„ 12	71	Ketley - -	Kingswinford -	Corbyn's Hall Colliery Co.	J. Alcock -	Engineer -	35	Whilst repairing the fly-wheel fence, he fell over it upon the fly-wheel race, when the crank of the engine struck him, inflicting injuries so serious that he died same day.	–	–	–	–	1	1
								Carried forward -	1	48	16	16	3	84

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	1	48	16	16	3	84
Nov. 12	72	Cathedral -	Brownhills -	W. Harrison - -	A. Glover -	Bondsman -	17	Fall of coal off the face in "thin-mine."	–	1	–	–	–	1
„ 13	73	Old Park -	Dudley - -	Earl of Dudley - -	W. Hall - -	Horse-driver	15	Knocked down and run over by a tub on surface.	–	–	–	–	1	1
„ 17	74	Sampson -	Oldbury -	R. Haines - -	G. Harley -	Collier boy	—	Fall of "lambs" in thick coal pit, the result of a "bump."	–	1	–	–	–	1
„ 18	75	Park Head -	Dudley - -	Evers and Martin -	J. Hughes -	Hooker-on	18	Brick fell down pit shaft whilst he was improperly standing in the bottom.	–	–	1	–	–	1
„ 19	76	Foxyards -	Tipton - -	Earl of Dudley - -	J. Perry - -	Bondsman -	40	Suffocated by loose gob, which rushed down upon him from side of stall in an old rib and pillar pit.	–	–	–	1	–	1
„ 20	77	Whitehall -	West Bromwich	J. Kendrick - -	W. Sharratt -	Blacksmith	—	Walked into the working pit shaft -	–	–	1	–	–	1
„ 23	78	Tividale Hall -	Dudley - -	S. Bradley - -	R. Bowater -	Deputy -	25	Injured by an explosion of fire-damp on the 14th instant; died this day.	2	–	–	–	–	2
					R. Cambridge -	Bondsman -	—							
„ 24	79	Moat - -	Tipton - -	Tipton Moat Colliery Co.	W. Baker -	Hooker-on -	44	Crushed by cage whilst he was improperly standing in the bottom.	–	–	1	–	–	1
„ 26	80	Cradley Park -	Cradley - -	J. King and Co. - -	E. Robinson -	Colliery boy	—	Fell into sump on the 24th instant; died this day.	–	–	1	–	–	1
„ 27	81	Portway Hall -	Oldbury -	W. H. Dawes - -	W. Holden -	Pikeman -	50	Fall of coal in thick coal pit. He and another workman were taking out the spurns and timber to throw a fall, when a "bump" forced a piece of coal upon him.	–	1	–	–	–	1
„ 30	82	Wallows -	Brockmoor -	Earl of [illegible] -	J. Raybould -	Bond-deputy	22	Suffocated by carbonic acid gas -	–	–	–	1	–	1
„ „	83	Fullwood's End	Coseley - -	Messrs. Smith - -	J. Davies -	Collier boy	12	Fall of coal in thick coal pit, brought about by a "bump."	–	1	–	–	–	1
								Carried forward -	3	52	20	18	4	97

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
								Brought forward -	3	52	20	18	4	97
1868. Dec. 5	84	Wyrley Cannock	Cheslyn Hay -	Wyrley Cannock Colliery Company.	S. Morgan -	Pikeman -	30	Fall of coal from the roof, which deceased had been cutting, but neglected to prop with timber.	–	1	–	–	–	1
„ 11	85	Groveland -	Dudley Port -	J. Bagnall and Sons -	G. Russell -	Bondsman -	30	Fall of roof in this coal mine, occasioned by a "bump."	–	1	–	–	–	1
„ 15	86	Wallows -	Brierley Hill -	Earl of Dudley - -	W. Bagott -	Deputy -	48	Fall of coal in thick coal whilst in the act of removing a timber prop to fire a shot.	–	1	–	–	–	1
„ „	87	Barn Farm -	Bilston - -	S. Speak - - -	J. Casey - -	Collier boy	—	Fall of coal in new-mine - -	–	1	–	–	–	1
„ 17	88	Ettingshall -	Sedgley - -	H. B. Whitehouse -	W. Jarratt -	Gin-driver -	—	Fell into pit shaft - - -	–	–	1	–	–	1
„ „	89	Wallows -	Brierley Hill -	Earl of Dudley - -	D. Allport -	Deputy -	42	Fall of coal in thick coal, about 2 cwt.	–	1	–	–	–	1
„ 24	90	Piercey - -	West Bromwich	T. Cox and Co. - -	J. Rushton -	Pikeman -	20	Fall of coal in thick coal pit, from between two converging slips, which might have been prevented by judicious timbering.	–	1	–	–	–	1
								Total - -	3	58	21	18	4	104

List of the FATAL ACCIDENTS and LOSS OF LIFE in IRONSTONE MINES in the SOUTH STAFFORDSHIRE and WORCESTERSHIRE DISTRICT, during the Year ending 31st December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Ironstone and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Feb. 5	1	Willenhall Road	Wolverhampton	J. Edge and Co. - -	J. Fenn - -	Bondsman -	—	Fall of ironstone measures -	–	1	–	–	–	1
„ 29	2	New Priestfield	Willenhall -	W. Ward and Sons -	J. Giles - -	Horsedriver	14	Fall of roof - - - -	–	1	–	–	–	1
„ „	3	Spring Vale -	Bilston - -	Union Coal Company -	A. Walters -	Sinker -	32	Whilst descending, the cotter belonging to the gin shafts fell out, which allowed the gin wheel to revolve rapidly, precipitating the unfortunate man to the bottom.	–	–	1	–	–	1
Mar. 20	4	Willenhall New	Willenhall -	Fletcher, Solly, and Co. -	J. Round - -	Collier boy -	14	Fall of ironstone measures - -	–	1	–	–	–	1
Apr. 25	5	Netherton -	Netherton -	Messrs. Grazebrook -	A. Pritchard -	Hooker-on -	15	Struck by a piece of timber which a miner threw down the shaft.	–	–	1	–	–	1
June 3	6	Parkfield -	Wolverhampton	Parkfield Company -	J. H. Fletcher -	Miner -	13	Kicked by a pit horse - -	–	–	–	1	–	1
Sept. 1	7	Willenhall New	Willenhall -	Fletcher, Solly, and Co. -	A. Cosdrift -	Ditto -	—	Fall of ironstone measures - -	–	1	–	–	–	1
Oct. 14	8	Woodwell -	Bloxwich -	Messrs. Bloomer -	P. Griffin - -	Hooker-on -	—	Injured by cage on the 19th ultimo; died this day.	–	–	–	1	–	1
„ 30	9	Moat - -	Tipton - -	Moat Colliery Company -	J. Gould - -	Miner -	18	Fall of gubbin ironstone in gate-road on the 29th; died this day.	–	1	–	–	–	1
Nov. 14	10	Darlaston Green	Darlaston -	Darlaston Steel and Iron Company.	R. Slater - -	Bondsman -	45	Fall of roof which deceased was trying to get down.	–	1	–	–	–	1
„ 16	11	Friar Park -	West Bromwich	W. H. Dawes - -	J. Burley -	Engineman	19	Got entangled in the winding machinery, of which he had the charge.	–	–	–	–	1	1
								Total - -	–	6	2	2	1	11

Mr. Wales' Report.

Report on the Working of the Mines Inspection Act (23 & 24 Vict. c. 151.) for the South Wales District, for the Year ended 31st December 1868.—By Thomas E. Wales, Esq.

Sir, Swansea, 27th February 1869.

As Inspector of Mines for the South Wales District, I have the honour to transmit to you herewith my report for the year ended December 31st, 1868.

The number of fatal accidents and loss of life arising therefrom are, I am happy to state, considerably less than the previous year, as will be seen from the following figures:—

Total lives lost in 1867 - -	309
Ditto 1868 - -	104
Less in 1868 - -	205

The following monthly statement will show when and how these accidents have occurred:—

Monthly Statement of Deaths caused by Accidents in the Coal Mines of the South Wales District in the Year 1868.

	Explosions.	Falls of Coal.	Falls of Stone.	Suffocation.	In Shafts.	Miscellaneous.	On surface.		Total.
							Machinery.	Miscellaneous.	
January	2	3	3	—	—	2	—	2	12
February	—	3	4	—	—	1	—	—	8
March	1	—	3	—	—	4	—	1	9
April	—	3	—	—	2	5	—	2	12
May	1	—	6	4	1	2	—	—	14
June	—	—	4	—	1	1	—	—	6
July	—	—	1	—	1	3	—	1	6
August	—	—	2	—	1	2	—	—	5
September	—	2	2	—	—	3	—	—	7
October	—	—	4	1	1	4	—	—	10
November	—	—	4	—	—	2	—	—	6
December	—	1	4	—	1	2	1	—	9
Total	4	12	37	5	8	31	1	6	104

And the following tabular form will show the per-centage of fatal accidents and persons killed, the quantity of coal raised per fatal accident, and quantity of coal raised per life lost:—

	Year 1868.	Year 1867.
Computed number of persons employed -	29,300	29,300
Quantity of coal raised in tons - -	9,000,000	9,376,443
Number of fatal accidents - - -	100	119
Number of lives lost by ditto - -	104	309
Persons employed per fatal accident - -	293	246
Persons employed per life lost - -	281	95
Tons of coal raised per fatal accident - -	90,000	76,406
Tons of coal raised per life lost - -	86,538	29,425

Explosions of gas.

Three explosions have occurred during the year, causing the loss of four lives.

The first took place in the Tila Coch Colliery, Rhondda Valley, on the 23d of January, resulting in the loss of two lives.

This explosion was caused by the reckless conduct of one of the colliers in removing the top from his safety lamp, and exposing a naked light in his place where there was a small "blower" giving off gas. He was himself rather severely burned.

This pit is sunk to the steam coals which give off large and not unfrequently sudden discharges of inflammable gas, and was worked with safety lamps, but the general discipline was of the worst description; the workmen being permitted to work with their safety lamps unlocked.

With the permission of the Secretary of State, proceedings were instituted against the owner, Mr. Thomas Jones, for an infringement of the third general rule, 23 & 24 Vict. Cap. 151., and a fine of 10*l.* was imposed.

The second explosion occurred in the Worcester Colliery, near Swansea, belonging to Messrs. Glasbrook and Co., on the 12th of March.

This colliery is not deep and by no means a fiery one, and it is worked with naked lights.

On the morning in question the "fireman," in making his morning's examination of the colliery, discovered a small quantity of gas lodged in the face of a certain heading.

He very properly fixed a danger signal to indicate the fact, and also acquainted the person (who happened to be his son) of it; but in the face of both precautions the unfortunate man, who was about 23 years of age, went past the danger signal with an open light, fired the gas, and caused his own death.

The third explosion happened on the 16th of May in the Cwmdû Colliery, near Maesteg, belonging to Messrs. John Brogden and Sons, and resulted in the death of one person.

This is a non-fiery coal, and worked with naked lights.

By some means not explained a small quantity of gas accumulated in the face of a certain heading, which was exploded by the deceased's naked light.

Suffocation.

Two accidents have occurred from this cause, resulting in the loss of five lives.

On the 13th of May an explosion of gas took place in the Carnarvon Colliery, near Loughor, belonging to the Techon Coal Company.

This colliery is worked with locked safety lamps, and a few days prior to the one in question the pumping apparatus was broken; a quantity of water collected in a certain part of the colliery, which stopped the ventilation there; gas accumulated, which was fired by the "pitman's" (the person whose duty it is to attend to all the pumping arrangements) Clanny safety lamp.

From 20 to 30 colliers were at work some considerable distance from where the explosion took place, and none of them were burned, but unfortunately they had to pass through the "after-damp" (carbonic gas being the products of the explosion) on their road to the bottom of the shaft, and the four deceased succumbed to its deadly effects; the remainder of the men succeeded in gaining the shaft, and were saved.

The other case occurred October 21st, in an old shaft belonging to the Neath Abbey Coal Company, near Neath, and resulted in the death of one person.

The deceased with another person were engaged in clearing out an old shaft communicating with extensive old works from which carbonic gas was issuing.

The person who was engaged with the deceased had ascended the shaft to take some tools down, and returned in a few minutes, when, to his great surprise, he found his companion quite dead.

Doubtless, a somewhat large discharge of this gas had been given off, and rendered the man insensible, and unable to call up the shaft for assistance.

Falls of Stone and Coal.

It affords me great satisfaction to be able to report a considerable diminution in the number of deaths under this head,—

Total for 1868 being	-	-	49
Do. 1867 „	-	-	67
Decrease in 1868	-		18

which I trust may, in some degree at least, be attributable to greater care on the part of both the colliers and officials, especially the former, on whom the responsibility of fixing proper and a sufficient quantity of timber principally devolves.

In this district it is the custom for the colliers to fix or set their own timber.

Shaft Accidents.

The number of deaths under this head is 8 as against 15 in 1867.

The great decrease is, I think, to be attributed for the most part to the sinking of fewer shafts than during the previous year.

Miscellaneous Underground Accidents.

The loss of 31 lives has occurred under this head, as against 30 in 1867.

1	death from an explosion of gunpowder;
8	do. by trams upon incline and engine planes;
21	do. by trams on horse and other roads; and
1	from sundries.
31	

The accidents under this head, which are more directly provided against by the Coal Mines Inspection Act, are those which occur on incline and engine planes. And in one instance (the London and Merthyr Colliery) I found the requirements of the Act had not been complied with.

With the permission of the Secretary of State, proceedings were instituted against the manager of the colliery, Mr. Davies, for an infringement of the 8th general rule, 23 & 24 Vict. c. 151., and a fine of 10*l.* was imposed by the magistrate, J. C. Fowler, Esq., which amount was given to the mother (a widow) of the deceased boy, in accordance with instructions received from the Secretary of State.

Surface.

Of the seven persons killed on the surface—

2	were crushed by trucks,
1	fell over a tip,
1	crushed by trams,
1	do. by a segment,
1	struck by a windlass handle, and
1	by machinery;

none of which, however, seem to call for any special remark.

I cannot conclude this my Fifth Annual Report without calling attention to the fact that out of the three explosions referred to (which happily were not attended with a great sacrifice of life, but it might have been otherwise) two were caused by a reckless disregard of the colliery rules. In one case (the Worcester Colliery) the unfortunate man fell a victim to his own recklessness; in the other two poor men were killed, and the offender was himself rather severely burnt.

Such reckless conduct cannot be too strongly condemned, and whenever detected legal proceedings ought always to be instituted against the offender.

Unfortunately many of the workmen have a stong inclination to conceal any breach of the rules committed by their fellow-workmen.

This makes it exceedingly difficult to discover infringements of the rules, and I fear few (unless fatal results have ensued, when a thorough investigation is made in the coroners' courts) are detected.

On the 9th instant three lives were lost by an explosion of gas in the Forchaman Colliery, caused by the firing of a shot, not only against the rules (shot firing being strictly prohibited in that part of the colliery) but also against the express orders of the fireman.

Two of the colliers who gave evidence at the inquest said that on the morning prior to the morning of the explosion they saw the hole ready for the powder to be put in, and that they knew shot firing was strictly prohibited.

One of them begged of the two deceased not to persist in firing a shot as it was against the rules, and because they all knew there was gas lodged on the top of a "fall" in an old heading exactly opposite the hole, and only 16 yards from it.

One of the deceased replied that if they had had the powder they would have fired the shot when they drilled the hole, but now they would not do so.

This was on the Monday morning, and the next morning (Tuesday) the same two men hurried into their working place and fired the shot which ignited the gas lodged close by and thus caused their own deaths as well as the death of another poor man who probably knew nothing of their intention to commit such a flagrant breach of the rules.

There were also other eight or nine persons who were proceeding to their working places more or less seriously burnt.

Although the two witnesses already referred to saw the officials of the colliery between the Monday morning (when they saw the hole ready to receive the powder) and the Tuesday morning, when the explosion occurred, they never mentioned the matter to one of them.

Had these men acted otherwise, proper steps could and no doubt would have been taken, and the loss of life prevented.

I have never met with a worse case than this, which is my only reason for referring to it here, for unless different conduct be pursued by the workmen I despair of any diminution of those terrible accidents being effected, if indeed they can be called accidents.

Ironstone Mines under the Coal Mines Inspection Act.

Eight lives have been lost in those mines during the past year, as against six in 1857, viz. :—

Five in the mines belonging to the Dowlais Iron Company ; three from falls of roof and two from stones falling down shafts.

Two in the mines belonging to the Plymouth Iron Company, both from falls of roof; and

One in the mines belonging to R. T. Crawshay, Esq.

I have, &c.

(Signed) Thos. E. Wales.

The Right Honourable
Henry A. Bruce, M.P., &c.
Home Secretary,
Whitehall, London.

List of the Fatal Colliery Accidents, and Loss of Life arising therefrom, in the South Wales District during the Year ended 31st of December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Underground.						On Surface.		
									Explosions.	Falls of Coal.	Falls of Stone.	Suffocation.	In Shafts.	Miscellaneous.	Machinery.	Miscellaneous.	Boilers bursting.
1868.																	
Jan. 1	1	Tondû	Bridgend	Brogden and Sons	Wm. Jones	Collier	24	Killed by a fall of roof	–	–	1	–	–	–	–	–	–
„ 2	2	Gadlys	Aberdare	Gadlys Iron Co.	Nichs. Price	Ditto	18	Ditto	–	–	1	–	–	–	–	–	–
„ „	3	Glyncorrwg	Briton Ferry	Glyncorrwg Coal Co.	John Rees	Ditto	27	Killed by falling over tip	–	–	–	–	–	–	–	1	–
„ 6	4	Cwmdare	Aberdare	Powell's Duffryn Steam Coal Company.	John Morris	Roadman	33	Killed by trams on engine plane	–	–	–	–	–	1	–	–	–
„ 7	5	Gadlys	Ditto	Gadlys Iron Co.	Titus Lewis	Collier	33	Killed by a fall of coal	–	1	–	–	–	–	–	–	–
„ „	6	Lower Duffryn	Ditto	P. D. S. Coal Co.	Peter Murphy	Ditto	26	Ditto	–	1	–	–	–	–	–	–	–
„ 8	7	No. 9 Colliery	Ditto	Fothergill and Co.	Thomas Jones	Ditto	50	Ditto	–	1	–	–	–	–	–	–	–
„ 13	8	Aberdare Merthyr.	Ditto	Aberdare Merthyr Steam Coal Co.	Wm. Jones	Ditto	27	Killed by trams	–	–	–	–	–	1	–	–	–
„ „	9	Cethin	Merthyr Tydfil	R. T. Crawshay	Richd. Evans	Ditto	45	Killed by a fall of roof	–	–	1	–	–	–	–	–	–
„ 21	10	Dynevor	Neath	Dynevor Coal Co.	Wm. Jones	Ditto	15	Killed by trams on surface	–	–	–	–	–	–	–	1	–
„ 23	11	Tila Coch	Pontypridd	Thomas Jones	David Thomas John Lewis	Ditto Ditto	35 28	Killed by an explosion of gas	2	–	–	–	–	–	–	–	–
Feb. 1	12	Broonbil	Taibach	Vivian and Sons	Watk. Jenkins	Haulier	17	Killed by trams	–	–	–	–	–	1	–	–	–
„ 10	13	Lletty Shenkin	Aberdare	Lletty Shenkin Coal Co.	David John	Collier	48	Killed by a fall of roof	–	–	–	–	–	–	–	–	–
„ 15	14	Slancainch	Cardiff	Duncan and Co.	Thos. George	Ditto	16	Killed by a fall of coal	–	1	–	–	–	–	–	–	–
„ 17	15	Vochrin	Dowlais	Guest and Co.	Dd. Richards	Ditto	14	Ditto	–	1	–	–	–	–	–	–	–
„ 19	16	Gellygwn	Pontypridd	John Priestley	John Pome	Ditto	27	Killed by a fall of stone	–	–	1	–	–	–	–	–	–
„ 20	17	Middle Duffryn	Aberdare	P. D. S. Coal Co.	Job Evans	Ditto	47	Ditto	–	–	1	–	–	–	–	–	–
„ „	18	Broadoak	Swansea	Broadoak Coal Co.	Jno. Thergun	Ditto	75	Killed by a fall of coal	–	1	–	–	–	–	–	–	–
„ 26	19	Primrose	Ditto	Primrose Coal Co.	John Nathaniel	Ditto	49	Killed by a fall of roof	–	–	1	–	–	–	–	–	–
Mar. 2	20	Wyndham	Bridgend	J. Brogden and Sons	Robt. Thomas	Labourer	29	Killed by a segment	–	–	–	–	–	–	–	1	–
„ 3	21	Bryndowy	Neath	Neath Abbey Coal Co.	Jno. Edwards	Haulier	14	Killed by trams	–	–	–	–	–	1	–	–	–
„ 4	22	Nantymain	Bridgend	J. Brogden and Sons	Jno. Evans	Collier	31	Killed by a fall of stone	–	–	1	–	–	–	–	–	–
								Carried forward	2	6	7	–	–	4	–	3	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Underground.						On Surface.		
									Explosions.	Falls of Coal.	Falls of Stone.	Suffocation.	In Shafts.	Miscellaneous.	Machinery.	Miscellaneous.	Boilers bursting.
1868.								Brought forward -	2	6	7	–	–	4	–	3	–
Mar. 7	23	Rhedla -	Glyn Neath -	J. H. Morgan - -	J. Williams -	Haulier -	44	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 12	24	Worcester -	Swansea -	T. Glasbrook - -	J. Richards -	Collier -	23	Killed by an explosion. The deceased went past the danger signal with a naked light, fired the gas, and caused his death.	1	–	–	–	–	–	–	–	–
„ 16	25	River - -	Aberdare - -	Fothergill and Co. -	Daniel Jones -	Ditto -	24	Killed by a fall of roof - - -	–	–	1	–	–	–	–	–	–
„ 21	26	Ferndale -	Pontypridd -	D. Davis and Sons -	Jno. Beecher -	Ditto -	34	Ditto - - -	–	–	1	–	–	–	–	–	–
„ 25	27	Oakwood -	Bridgend -	Wm. Davies - -	Jno. Morris -	Ditto -	18	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 26	28	Gellia Cadoxton	Neath - -	Evans and Bevan -	Thos. Price -	Ditto -	—	Ditto - - - -	–	–	–	–	–	1	–	–	–
April 2	29	Tunnel -	Aberdare - -	Fothergill and Co. -	Wm. Jones -	Collier -	16	Killed by a fall of coal - -	–	1	–	–	–	–	–	–	–
„ „	30	Taibach -	Merthyr Tydfil -	Ditto -	Essex Williams -	Ditto -	23	Ditto - - -	–	1	–	–	–	–	–	–	–
„ 4	31	Abercwmboy -	Aberdare -	D. Davis and Sons -	Jos. Quistel -	Ditto -	35	Ditto - - - -	–	1	–	–	–	–	–	–	–
„ 7	32	Castle -	Merthyr Tydfil -	R. T. Crawshay - -	Dd. Davies -	Mason -	40	Killed by falling from carriage whilst ascending the shaft.	–	–	–	–	1	–	–	–	–
„ 8	33	Aberdare -	Aberdare -	Aberdare Coal Co. -	Jno. Price -	Haulier -	49	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ „	34	Pwllfarvw -	Glyn Neath -	Neath Abbey Coal Co. -	Wm. Rosser -	Collier -	70	Killed by trams on engine plane -	–	–	–	–	–	1	–	–	–
„ 16	35	Cwmllynfell -	Ystalyfera -	James and Aubrey -	Jonah Jones -	Labourer	13	Ditto - - -	–	–	–	–	–	1	–	–	–
„ 21	36	Navigation -	Aberdare -	Nixon and Co. - -	Ed. Hammer -	Ditto -	48	Killed by trucks on surface -	–	–	–	–	–	–	–	1	–
„ 23	37	Oakwood -	Bridgend -	Wm. Davis - -	Thos. Hawkins -	Sinker -	33	Killed by rope breaking - -	–	–	–	–	1	–	–	–	–
„ „	38	Ferndale -	Pontypridd -	D. Davis and Sons -	Hy. Josephs -	Doorboy	13	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 24	39	Dyncwl -	Kidwelly -	David Williams - -	Jonah Williams -	Labourer	24	Killed by being struck by a windlass handle.	–	–	–	–	–	–	–	1	–
„ 29	40	Ferndale -	Pontypridd -	D. Davis and Sons -	Hy. Jones -	Doorboy	13	Killed by trams - - -	–	–	–	–	–	1	–	–	–
May 1	41	Cwmcunan -	Aberdare -	H. Evans and Co. -	Geo. Cotes -	Doorboy	13	Killed at bottom of shaft - -	–	–	–	–	1	–	–	–	–
„ 2	42	California -	Llanelly -	Norton and Co. - -	Elias Watkins -	Collier -	42	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
								Carried forward -	3	9	10	–	3	12	–	5	–

List of Fatal Colliery Accidents--*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Underground. Explosions. &	Falls of Coal.	Falls of Stone.	Suffocation.	In Shafts.	Miscellaneous.	On Surface. Machinery.	Miscellaneous.	Boilers bursting.
1868.								Brought forward -	3	9	10	–	3	12	–	5	–
May 6	43	Craig Cwm -	Clydach -	Geo. B. Strick - -	D. Davies -	Collier -	50	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ 8	44	Bryndu -	Bridgend -	Bryndu Coal Co. -	T. Rogers -	Haulier -	14	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 13	45	Carnarvon -	Loughor -	Techon Coal Co. -	Dd. Bevan -	Collier -	64	Killed by suffocation, the products of an explosion of gas.	–	–	–	4	–	–	–	–	–
					J. Hopkins -	Ditto -	24										
					T. Phillips -	Ditto -	27										
					T. Richards -	Ditto -	20										
„ 16	46	Cwmdu -	Maesteg -	J. Brogden and Sons -	T. Jones -	Ditto -	34	Killed by an explosion of gas -	1	–	–	–	–	–	–	–	–
„ 21	47	Ferndale -	Pontypridd -	D. Davis and Sons -	D. Davies -	Ditto -	38	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ „	48	Gadlys -	Aberdare -	Gadlys Iron Co. - -	Hy. John -	Ditto -	41	Ditto - - - -	–	–	1	–	–	–	–	–	–
„ 23	49	Tondû -	Bridgend -	J. Brogden and Sons -	T. Howell -	Ditto -	23	Ditto - - -	–	–	1	–	–	–	–	–	–
„ 26	50	Llynvi -	Ditto -	Llynvi Iron Co. - -	T. Richards -	Ditto -	58	Ditto - - -	–	–	1	–	–	–	–	–	–
„ 27	51	Glinea -	Llanelly -	Sims, Willyams, Neville, and Co.	Evan Davies -	Ditto -	42	Killed by an explosion of gunpowder.	–	–	–	–	–	1	–	–	–
June 2	52	Glenwaindraeth	Llanelly -	W. and D. Evans -	J. Thomas -	Collier -	27	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ 13	53	Abergorkie -	Pontypridd -	Geo. Jusdle and Sons -	Dd. Richards -	Ditto -	18	Ditto - - -	–	–	1	–	–	–	–	–	–
„ 15	54	Hirwain -	Aberdare - -	Hirwain Coal and Iron Company.	Jas. Undergrave	Labourer	35	Ditto - - - -	–	–	1	–	–	–	–	–	–
„ 18	55	Cwmdare -	Aberdare - -	P. D. S. Coal Co. -	Jno. Jones -	Ditto -	23	Killed by trams on engine plane -	–	–	–	–	–	1	–	–	–
„ 19	56	Glyncoorwg -	Bristow Ferry -	Glyncorrwg Coal Co. -	J. Lloyd - -	Collier -	20	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ 29	57	Yneisfio -	Pontypridd -	Twedyrhiw Coal Co. -	Jas. Evans -	Door boy	14	Killed by trams - - -	–	–	–	–	–	1	–	–	–
July 3	58	Gadbys - -	Aberdare - -	Gadbys Iron Company -	Jas. Thomas -	Collier -	25	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ 9	59	Middle Duffryn	Ditto - -	P. D. S. Coal Co. -	Jno. Davis -	Door boy	13	Killed by trucks on surface -	–	–	–	–	–	1	–	1	–
„ 10	60	Bryndowy -	Neath - -	Neath Abbey Coal Co. -	Thos. Jones -	Haulier -	27	Killed by a kick of a horse - -	–	–	–	–	–	1	–	–	–
„ „	61	Morfa -	Taibach -	Vivian and Sons - -	Isaac Kingdon -	Hitcher -	21	Killed by a tram at bottom of shaft	–	–	–	–	1	–	–	–	–
								Carried forward -	4	9	20	4	4	17	–	6	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Underground.						On Surface.		
									Explosions.	Falls of Coal.	Falls of Stone.	Suffocation.	In Shafts.	Miscellaneous.	Machinery.	Miscellaneous.	Boilers bursting.
1868.								Brought forward -	4	9	20	4	4	17	–	6	–
July 13	62	Garth - -	Bridgend -	J. Brogden and Sons -	Thos. Watkin -	Collier -	21	Killed by falling down shaft -	–	–	–	–	1	–	–	–	–
„ 17	63	Pentrefellin -	Swansea - -	Vivian and Sons - -	Thos. Morgan -	Trammer	15	Killed by trams - - -	–	–	–	–	–	1	–	–	–
Aug. 4	64	Lantwit Main -	Llantrissant -	Main Coal Co., Llantwit -	T. Thomas -	Collier -	43	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ 4	65	Morfa - -	Taibach -	Vivian and Sons - -	Lewis Watkin -	Door boy	13	Killed by trams on engine plane -	–	–	–	–	–	1	–	–	–
„ 10	66	Middle Duffryn	Aberdare -	P. D. S. Coal Co. -	J. Griffiths -	Collier -	14	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 21	67	Deep Duffryn -	Ditto - -	Nixon, Taylor, and Co. -	Calib Bray -	Ditto -	21	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ 21	68	Blaengwaur -	Ditto - -	D. Davis and Sons - -	Roger Prosser -	Door boy	11	Killed by a fall of roof, deceased was able to read and write.	–	–	1	–	–	–	–	–	–
„ 22	69	Glinea -	Llanelly - -	Sims, Willyams, Neville, and Co.	Thos. Richards -	Lander -	51	Killed by falling down shaft -	–	–	–	–	1	–	–	–	–
Sept. 4	70	Tynewydd -	Bridgend -	T. Thomas - -	Wm. Howells -	Collier -	20	Killed by a fall of stone - -	–	–	1	–	–	–	–	–	–
„ 16	71	Pwllfaron -	Neath - -	Neath Abbey Coal Co. -	T. Richards -	Ditto -	40	Killed by a fall of coal - -	–	1	–	–	–	–	–	–	–
„ 17	72	Hirwain -	Aberdare - -	Hirwain Coal and Iron Co.	Za. Williams -	Ditto -	36	Ditto - - - -	–	1	–	–	–	–	–	–	–
„ 21	73	Pwllfaron -	Neath - -	Neath Abbey Coal Co. -	J. Jones - -	Ditto -	44	Ditto - - - -	–	1	–	–	–	–	–	–	–
„ 26	74	Merthyr Dare	Aberdare - -	Rhys and Richards -	W. Phillips -	Haulier -	23	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 28	75	Deep Duffryn -	Ditto - -	Nixon, Taylor, and Co. -	Fernham Sterry	Door boy	14	Ditto - - -	–	–	–	–	–	1	–	–	–
„ „	76	Nantmelyn -	Ditto - -	Mordecai Jones - -	Enoch Francis -	Haulier -	21	Ditto - - - -	–	–	–	–	–	1	–	–	–
Oct. 3	77	Lantwit -	Llantrissant -	T. Powell - -	T. Williams -	Collier -	29	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ 5	78	Lower Duffryn	Aberdare - -	P. D. S. Coal Co. - -	J. Rees - -	Haulier -	19	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 9	79	Llangennech -	Llanelly -	T. P. Margrave - -	Isaac Williams -	Collier -	32	Killed by trams on engine plane -	–	–	–	–	–	1	–	–	–
„ 10	80	Cwmaman -	Aberdare - -	H. Evans and Co. -	Wm. Davies -	Haulier -	27	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ 13	81	Park - -	Pontypridd -	D. Davis and Co. -	Rees Ellis -	Collier -	33	Killed by a fall of stone - -	–	–	1	–	–	–	–	–	–
								Carried forward -	4	12	26	4	6	26	–	6	–

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Underground.						On Surface.		
									Explosions.	Falls of Coal.	Falls of Stone.	Suffocation.	In Shafts.	Miscellaneous.	Machinery.	Miscellaneous.	Boilers bursting.
1868.								Brought forward -	4	12	26	4	6	26	–	6	–
Oct. 14	82	Lantwit -	Llantrissant -	T. Powell - -	Dd. Roderick -	Collier -	13	Killed by falling off carriage whilst descending shaft.	–	–	–	–	1	–	–	–	–
„ 21	83	Maine - -	Neath - -	Neath Abbey Coal Co. -	J. Lewis -	Ditto -	33	Killed by suffocation - - -	–	–	–	1	–	–	–	–	–
„ 22	84	Lower Duffryn	Aberdare - -	P. D. S. Coal Co. -	J. Passmore -	Ditto -	29	Killed by trams on incline plane -	–	–	–	–	–	1	–	–	–
„ 23	85	Bute Merthyr -	Pontypridd -	Marquis of Bute - -	Jas. Cox -	Ditto -	35	Killed by a fall of stone - -	–	–	1	–	–	–	–	–	–
„ 31	86	Blanant -	Aberdare - -	Fothergill and Co. - -	Evan Evans -	Ditto -	28	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
Nov. 12	87	Cwm Neol -	Aberdare -	P. D. S. Coal Co. -	Anthy. Griffiths	Collier -	17	Killed by a fall of roof - -	–	–	1	–	–	1	–	–	–
„ 14	88	Llynvi -	Bridgend -	Llynvi Iron Co. -	Wm. Jenkins -	Haulier -	15	Killed by trams - - -	–	–	–	–	–	1	–	–	–
„ „	89	Bryndu -	Do. - -	Bryndu Coal Co. -	Ll. Llandriggen	Ditto -	15	Ditto - - -	–	–	–	–	–	1	–	–	–
„ 28	90	Plymouth -	Merthyr Tydfil -	Fothergill and Co. -	Morgan Rees -	Collier -	13	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ „	91	Broadoak -	Loughoo -	Broadoak Coal Co. -													
Dec. 5	92	Bargoed -	Dowlais - -	Guest and Co. - -	Thos. Thomas -	Collier -	12	Killed by trams on engine plane -	–	–	–	–	–	1	–	–	–
„ 8	93	Hirwain -	Aberdare -	Hirwain Coal and Iron Co.	Jas. Llewellyn -	Ditto -	12	Killed by trams on level - -	–	–	–	–	–	1	–	–	–
„ 16	94	Abergwaur -	Ditto - -	P. D. S. Coal Co. -	Lewis Davies -	Ditto -	25	Killed by a fall of stone - -	–	–	1	–	–	–	–	–	–
„ 22	95	Star - -	Kidwelly -	H. Pratt - -	Jno. Evans -	Ditto -	29	Ditto - - -	–	–	1	–	–	–	–	–	–
„ 23	96	Bargoed -	Dowlais - -	Guest and Co. - -	Jno. Davies -	Ditto -	12½	Killed by a fall of coal - -	–	1	–	–	–	–	–	–	–
„ 28	97	Merthyr Dare	Aberdare -	Rhys and Richards -	Richd. Phillips -	Ditto -	28	Killed by a rope breaking, which was being used for raising old slides which were being replaced.	–	–	–	–	1	–	–	–	–
„ „	98	Lletty Shenkin	Ditto - -	Lletty Shenkin Coal Co. -	J. Richards -	Engineer	18	Killed by becoming entangled with the machinery.	–	–	–	–	–	–	1	–	–
„ 30	99	Vochriw -	Dowlais -	Guest and Co. - -	G. Jenkins -	Collier -	19	Killed by a fall of roof - -	–	–	1	–	–	–	–	–	–
„ „	100	Pantyffymon -	Llanelly - -	Dd. Lloyd and Son -	Morris Morris -	Ditto -	28	Ditto - - -	–	–	1	–	–	–	–	–	–
								Totals -	4	12	37	5	8	31	1	6	–

Mr. Moore's Report.

Report of the Inspector of Mines and Collieries in the Eastern District of Scotland, for the Year ended 31st December 1868.—By Ralph Moore, Esq.

Sir, 7, Queen Square, Glasgow, 28th February 1869.

I have the honour to submit my Annual Report as Inspector of Coal Mines for the Eastern District of Scotland.

The accompanying Schedules show that in the District during the year 1868.

In and about coal mines were lost, lives	- -	43
The number of male persons employed was	- -	29,000
The number of women working on the surface	- -	683
The quantity of coal raised - - -	Tons	8,456,084
The quantity of coal raised for every life lost	- -	196,653
In 1867, the quantity ditto	- -	131,622
The average ditto, England and Scotland 1868	- -	103,429

In inspected ironstone mines one life was lost.

The tabulated results show that the loss of life last year was less than in 1867, and also that the quantity of coal raised for every life lost was above the average.

Falls of roof and coal are still the most frequent cause of deaths. In my former reports I have expressed an opinion that the deaths from these causes would be fewer if experienced men were employed to visit the men's working places at intervals during each shift, to set props, or at least to see that sufficient props are put up to the roof and coal. I am glad to state that a beginning has been made in two collieries in the Wishaw and Hamilton districts. These two collieries put out more than 300,000 tons of coal per annum. The managing partner of one of these collieries writes me, "I have "appointed a man to do nothing else but attend to the treeing and drawing of all wood "at the stooping, and I find we are getting a better class of men. We have never "seen any fire-damp, but we always keep them working with locked lamps at the "stooping."

There is not a great quantity of fire-damp in the "goaf" of the Wishaw and Hamilton coal fields, but I have more than once detected it, and the only death from explosion of fire-damp last year was caused, I had reason to believe, from a fall of roof, driving out some gas which was in the "goaf," upon the naked lights of some men working at pillars (stoops), one of whom was the deceased.

There were two steam-boiler explosions last year, one at Bo'ness, and the other at Motherwell. Both were high pressure boilers, 5 feet diameter, $\frac{3}{8}$ in. plates; the former was 20 years and the latter 15 years in use. It did not appear that either of them had been short of water, and, excepting the worn-out condition of the boilers, there was nothing to account for the explosions. A question arose out of the Bo'ness explosion as to compliance with the 13th general rule, which requires that *every* boiler shall be provided with a proper steam gauge. The boiler which exploded was one of a range of five boilers all connected together by one steam-pipe. A steam gauge was placed on this steam-pipe, and thus every boiler, when working, had a steam gauge, or was connected with a steam gauge; but the boiler had been "off" getting cleaned, and steam was being raised in it when it burst, so that it was not at the time provided or in connexion with a steam gauge; nor can any one of a range of boilers similarly situated, at all times comply with the general rule, unless there be a steam gauge upon each boiler.

At the suggestion of Crown Counsel I sent a circular to the coal masters in my district, requesting them to put a steam gauge on each boiler. Many of them have already complied, and others are doing so.

A breakage of a wire rope with a weight of 5 cwts., resulted in the loss of two lives. The rope was afterwards tested and bore a breaking strain of ten tons. The drum and pulley were only five feet diameter, which is rather small for wire ropes, but the working load was only 12 cwts., and it had only raised 8,000 tons. I could not account for the failure.

The shaft accidents are still high, and are doubtless in part owing to the increased number of shafts necessary for compliance with the statute.

I made investigations into all the fatal accidents; into such of the non-fatal accidents as seemed to call for investigation, and made examinations of other collieries where I had reason to think an examination was necessary.

I have taken every opportunity of examining such boys as came under my notice as to the educational provisions of the statute. The practice appears to be, not to allow any boy to enter the pit until he is 12 years of age. I have found boys under that age, but they could generally read and write, and I believe there are not many young boys go down the pits in this district, without being able to read and write a little. In scarcely an instance did the boys attend a night school. As a general rule boys get all the education they are likely to get before they enter the pit. There can be no doubt it would inflict a hardship on many a man, struggling to bring up a large family, to compel him to dispense with the services of his boy until he is twelve years of age, but there can be no doubt as to the benefit to the boy. Education at the colliery villages is both cheap and plentiful; there is abundance of good schools, with good teachers, convenient to the villages where the parents reside.

Last year there were 147 companies working coal in this district, some of them raising more than 400,000 tons of coal annually, and some of them less than 5,000 tons.

As the result of a careful estimate I find, that of the persons employed, every fifteenth person is employed in looking to the safety of the others, in the shape of manager, overman, deputy overman, fireman, and overlooker.

There are, therefore, in this district 2,000 persons employed by those companies to keep the pits safe for 29,683 persons engaged in and about mines, in working and conveying coal from the face until it is put into wagons at the surface.

Where the safety of the persons employed does not depend upon themselves, it depends upon these 2,000 persons, and the degree of safety which they afford depends upon the discipline and control exercised by the owners and principal agents, who alone have the control of this large staff. No important alteration can be made unless they sanction it; they propose the special rules, and can make application for their amendment at any time, and it is in their power, either by their own observation or by employing other skilled persons to do it for them, to see that the special rules are observed, and that proper discipline is maintained by the regular staff.

I have constantly urged this view of the duties of owners and principal agents, and especially of the benefit to be derived from close personal attention to the underground working arrangements. I believe that supervision would be most effectually done, where the owner himself does not personally exercise it, by a person not constantly employed in the colliery, but who would periodically visit it, and examine the working arrangements.

When we consider that year by year the pits in this district are becoming deeper, and consequently the machinery and arrangements increasing in magnitude, the decrease in the loss of life is creditable to the owners and managers of mines, and should stimulate them to persevere in making and adopting such arrangements as will lead to still better results. There can be no doubt that the adoption of the best means for increasing the safety and comfort of the workmen is true economy in a commercial point of view.

The last year was no improvement upon the preceding one as regards the coal trade. The prices of coal ranged very low; still owing to the opening up of new pits, and also owing to the men working more steadily, the quantity raised is in excess of 1867.

The opening up of new pits has kept up the demand for miners, and as a natural consequence wages have not been reduced. With the view of giving more information upon this subject than is generally known, I have got from some of the coal-masters the actual earnings of five colliers in their employment, which I believe to be a fair average of the district. The details are given below.

				£	s.	d.
No. 1.	Worked - 229	days for	-	42	2	2
	Was idle - 83					
No. 2.	Worked - 253	" "	-	45	10	10
	Was idle - 59					
No. 3.	Worked - 265	" "	-	50	19	1½
	Was idle - 47					
No. 4.	Worked - 249	" "	-	62	6	2
	Was idle - 63					
No. 5.	Worked - 245	" "	-	53	16	0
	Was idle - 67					

Annexed also is a chart showing the localities from whence the coals were raised, and where the accidents occurred.

I have, &c.
(Signed) RALPH MOORE,
Inspector of Mines.

The Right Hon. H. A. Bruce, M.P.,
Her Majesty's Principal Secretary of State,
London.

Loss of Life, &c., in the Eastern District of Scotland during the Year 1868.

Name of County.	Lives lost.						Male Persons employed.	Quantity of Coal raised. —Tons.	Persons employed per Life lost.	Tons of Coal raised per Life lost.	Tons of Coal raised per Man employed.	Number of Women employed above ground.
	Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.						
Lanark - -	1	15	3	2	2	23	15,016	5,184,990	655	225,434	344	—
Stirling (East) - -	—	3	5	1	—	9	2,700	628,601	300	69,844	233	—
Kinross - -	—	—	—	—	—	—	90	25,327	—	—	281	—
Perth - - -	—	—	—	—	—	—	45	13,610	—	—	302	—
Fife - - -	—	5	—	—	—	5	4,614	1,370,008	923	274,001	297	—
Edinburgh - -	—	—	—	1	1	2	2,326	471,973	116	235,986	203	—
Haddington - -	—	2	—	—	—	2	805	176,310	402	88,155	219	—
Clackmannan - -	—	—	1	—	—	1	863	246,611	1,121	246,611	232	—
Linlithgow - -	—	—	—	1	—	1	2,327	333,658	2,443	333,658	143	—
Peebles - -	—	—	—	—	—	—	14	5,000	—	—	337	—
Totals and Averages	1	25	9	5	3	43	29,000	8,456,088	692	196,653		683

Diagram showing Quantity of Coal raised and lives lost in the different localities of the Eastern District of Scotland. During the year 1868.

COUNTY.	OUTPUTS. 1867 TONS	OUTPUTS. 1868 TONS	LIVES LOST 1867	LIVES LOST 1868
LANARK (PART OF)	4.784.001	5.184.990	33	23
STIRLING (EAST)	616.618	628.601	6	9
KINROSS	22.000	25.327	0	0
PERTH	31.273	13.610	0	0
FIFE	1.214.250	1.370.008	11	5
EDINBURGH	489.160	471.973	6	2
HADDINGTON	114.250	176.310	2	2
CLACKMANNAN	237.777	246.611	1	1
LINLITHGOW	383.383	333.658	1	1
PEEBLES	4.656	5.000	0	0
TOTALS	7.897.368	8.456.088	60	43

EXPLANATIONS.

Scale of Quantities.
1 sq. inch = 1.000.000 Tons.

Scale of Miles.
0 1 2 3 4 5 6 7 8 9 10

Quantities of Coal raised in each locality from Seams in the true Coal measures thus ○

Carboniferous Limestone measures ⊙

Lives lost by Explosions +

Other Causes +

EASTERN DISTRICT OF SCOTLAND.

Colliers Annual Earnings, Year 1868.

Lanarkshire.

No. of Fortnight.	Days worked.	Earnings. £	s.	d.	Remarks. Cause of Idleness.
1	–	-	-	-	Pit idle.
2	11	1	14	10	Miners' meeting.
3	10	1	13	5	
4	10	1	12	7	
5	10	1	12	1	
6	9	1	9	5	
7	9	1	9	6	
8	8	1	6	11	Miners' meetings.
9	8	1	9	2	
10	9	1	10	4	
11	10	1	14	0	
12	10	1	14	9	
13	8	1	17	1	
14	9	1	15	2	
15	9	1	18	9	
16	10	2	5	3	
17	10	2	4	10	
18	9	1	14	11	
19	6	1	5	11	
20	5	1	1	2	
21	9	1	15	7	
22	6	0	19	9	
23	10	1	16	5	
24	11	2	2	0	
25	12	2	0	6	
26	11	1	17	10	
	229	42	2	2	

Fifeshire.

No. of Fortnight.	Days worked.	Earnings. £	s.	d.	Remarks. Cause of Idleness.
1	7½	3	2	6	
2	10	4	2	3	
3	9	3	2	7	
4	10	3	14	2	
5	8½	3	0	5	
6	11	4	0	10	
7	10	3	19	10	
8	10	4	11	11	
9	10	3	5	8	
10	7½	2	8	2	
11	9	2	18	7	
12	10	3	12	6	
13	10½	4	2	6	
14	10	3	12	6	
15	8½	2	6	9	
16	11	3	13	6	
17	11	4	11	1	
18	10	3	8	9	
19	9½	3	11	3	
20	10¼	3	5	6	
21	9½	3	3	10	
22	9½	3	2	6	
23	11	3	7	11	
24	9½	3	2	0	
25	10	3	16	9	
26	10¼	3	17	6	
	253¼	91	1	9	

The Lothians.

No. of Fortnight.	Days worked.	Earnings. £	s.	d.	Remarks. Cause of Idleness.
1	9	2	4	11	Sometimes owing to repairs on engines and boilers the water is not out, and the men are thrown idle for a day or two at the most. Generally, however, the cause of idleness is attributable to the collier himself.
2	9½	2	3	8	
3	10	2	0	11	
4	9½	2	0	8	
5	10	1	18	1	
6	11	2	2	9	
7	11	2	0	9½	
8	8	1	10	4	
9	10	1	14	2	
10	11	2	0	2	
11	10½	1	15	5	
12	9	1	15	6	
13	11	2	5	0	
14	10	1	18	3	
15	10	1	14	11	
16	12	2	4	0	
17	9	1	14	0	
18	10	1	16	10	
19	9½	1	12	0	
20	11½	1	17	1	
21	10	1	15	5	
22	10½	1	19	7	
23	11	2	8	10	
24	10	1	17	10	
25	10	2	1	0	
26	12	2	7	0	
	265	50	19	1½	

Lanarkshire, Hamilton.

No. of Fortnight.	Days worked.	Earnings. £	s.	d.	Remarks. Cause of Idleness.
1	7	1	12	9	5 days holidays.
2	10	1	18	3	2 attending meetings.
3	10	1	17	4	2 ,,
4	10	1	13	8	2 ,,
5	11	3	7	6	1 ,,
6	10	2	6	11	2 ,,
7	3	0	11	4	9 pit standing.
8	5	0	19	0	7 ,,
9	11	2	2	9	1 attending meeting.
10	9	1	14	2	3 pit standing.
11	11	2	2	9	1 attending meeting.
12	11	2	10	10	1 ,,
13	10	2	10	10	2 ,,
14	10	2	8	7	2 ,,
15	10	2	15	8	2 ,,
16	10	2	7	3	2 ,,
17	7	2	9	6	2 ,, and 3 holidays.
18	10	3	2	2	2 attending meeting.
19	11	2	14	11	1 ,,
20	10	2	13	3	2 ,,
21	10	2	13	0	2 ,,
22	11	3	12	2	1 ,,
23	9	2	12	8	1 ,,
24	12	3	7	9	
25	12	3	11	4	
26	9	2	9	10	1 attending meeting.
	249	62	6	2	

Lanarkshire, Wishaw.

No. of Fortnight.	Days worked.	Earnings. £	s.	d.	Remarks. Cause of Idleness.
1	6	1	6	0	Holidays.
2	8	1	12	7	Miners' meetings.
3	8	1	8	7	
4	10	2	1	5	
5	9	2	0	5	
6	11	2	3	8	
7	12	2	13	10	
8	7	1	5	3	Miners' strike.
9	11	2	12	7	Miners' meetings.
10	10	2	3	9	
11	12	2	14	8	
12	8	1	17	3	Bad health.
13	11	2	0	0	
14	11	2	9	7	Miners' meetings.
15	8	1	15	3	
16	11	2	4	11	
17	10	2	2	9	
18	8	1	18	7	Unwell.
19	7	1	11	11	,,
20	7	1	12	4	,,
21	10	2	3	10	Miners' meetings.
22	11	2	15	4	
23	11	2	10	3	
24	7	1	8	9	
25	12	3	2	10	
26	9	1	19	8	
	245	53	16	0	

List of the Fatal Colliery Accidents, and Loss of Life arising therefrom, in the Eastern District of Scotland, during the Year ended 31st December 1868.

Date.	No. of Accident.	Name of Colliery.	Where situate.	Owners' or Agents' Names.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives Lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868. Jan. 15	1	Balquhatstone -	Slamannan -	John Watson - -	Robert Paterson -	Miner -	35	While he was ascending the pit, the pinion wheel of the engine broke and the descending cage being heaviest, he was carried to the pulleys, and fell back into the pit. Brake on fly wheel.	–	–	1	–	–	1
Feb. 7	2	Hill of Beath -	Dunfermline -	Ord. Adams	Rob. Campbell -	Brusher -	24	Failing to take down a side piece of sandstone shaken by a shot, it fell over upon him.	–	1	–	–	–	1
„ 8	3	Stanrigg -	Falkirk - -	Alexr. Wilson - -	Wm. Bennie -	Collier -	23	He was supposed to have fallen at a broken step, while descending traps to the bottom of a 40-fathom pit.	–	–	1	–	–	1
Mar. 2	4	Greenfield -	Hamilton -	Hamilton Coal Co. -	Wm. M'Innis -	Ditto -	23	He was underholing, and four tons of coal rolled over on him. The seam was four feet high.	–	1	–	–	–	1
„ „	5	Blackbraes -	Falkirk - -	James Russel and Son -	James Weir -	- - -	55	- - - - -	–	1	–	–	–	1
„ 12	6	Carnbroe No. 8	Holytown -	Merry and Cunninghame -	R. Montagu -	Collier -	31	He was underholing the lower leaf of a 3 feet coal under 3 feet of the upper leaf, which fell upon him. He lived three days afterwards.	–	1	–	–	–	1
„ 17	7	Darngavil No. 5	Airdrie - -	Pat. Rankin - -	B. Montagu -	Drawer -	13	He worked with his father and brother, and was passing along the face when the roof fell on him. Seam 3 feet; roof sandstone.	–	1	–	–	–	1
„ 19	8	Capeldrae -	Lochgelly -	Robert Aytoun - -	Wm. Munro -	Collier -	23	He was working under a mass of top coal, which fell upon him. Seam 6 feet thick, in two leaves.	–	1	–	–	–	1
								Carried forward -	–	6	2	–	–	8

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owners' or Agents' Names.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.								Brought forward -	–	6	2	–	–	8
Apr. 7	9	Parkhead -	Motherwell -	John Watson -	— Hamgan -	Collier -	—	Burned by an explosion of gas from the goaf. Six men were burned. He died some weeks afterwards.	1	–	–	–	–	1
„ 11	10	Commonhead -	Airdrie -	Colville and Gray -	Jas. M'Dermot -	Ditto -	40	Was underholing, when a blade of sandstone 6 inches thick, 8 feet by 7 feet, fell on him. Seam 30 inches. Roof sandstone. Overman warned him to put up props.	–	1	–	–	–	1
„ 16	11	Airdriehill -	Ditto -	Jas. Black and Son -	Jno. Rankine -	Brusher -	22	He was building the roadside when a stone fell out of the roof by a lipe upon him. Seam 4 feet. Roof sandstone.	–	1	–	–	–	1
„ 20	12	Easter Glentore	Ditto - -	Robert Hunter - -	Dd. Hunter -	Manager -	40	Fall of sand and gravel in a mine near the surface. Mine not properly wooded.	–	–	–	–	1	1
„ 21	13	Grangemouth -	Falkirk -	Grangemouth Coal Co. -	W. Chalmers -	Brusher -	36	He was preparing to blast down the roof, twelve feet back from the face, when it fell upon him. Seam 3 feet. Roof shale.	–	1	–	–	–	1
May 1	14	Muirhouse -	Wishaw - -	Archd. Russel - -	Jno. Yuil -	Driver -	11	This boy was passing along with a train of tubs when the roof fell upon him.	–	–	–	1	–	1
„ 13	15	Greenhill -	Holytown -	Robert Young - -	Pat. Cairney -	Collier -	25	A piece of top coal weighing half a ton fell upon him. The seam is 8 feet thick in two leaves, the first leaf was 4 feet in advance, and he was working at it.	–	1	–	–	–	1
„ 14	16	Lumphinans -	Lochgelly -	Lumphinans Iron Company	W. Brown -	Ditto -	43	Fall of roof by a lipe. The seam was 30 inches. Roof a seam of coal 6 feet thick.	–	1	–	–	–	1
								Carried forward -	1	11	2	1	1	16

List of Fatal Accidents in Coal Mines—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.								Brought forward -	1	11	2	1	1	16
May 21	17	Bells Dyke -	Airdrie - -	Dundas Simpson -	Sam. Morton -	Collier -	26	Fall of roof (sandstone) while taking out pillars. Seam 4 feet.	–	1	–	–	–	1
June 6	18	Mossend -	Holytown -	Mossend Iron Co. -	R. Bennie -	Drawer -	15	Fall of roof at pit-bottom. Not properly supported.	–	1	–	–	–	1
„ 18	19	Whitehill -	Airdrie - -	Henderson and Dimmack	A. Sommerville -	Overman -	—	Crushed by cage at pit-bottom when stepping on.	–	–	–	1	–	1
July 15	20	Skellyton -	Larkhall - -	Hamilton and M'Culloch -	A. Fleming -	Driver -	—	Hutch got off rails, and knocked out a prop, and roof fell upon him.	–	1	–	–	–	1
„ 25	21	Ditto - -	Ditto - -	Ditto - - - -	J. Loudon -	Overman -	40	Was leaning over pit mouth at low scaffold, when the cage came down, and knocked him into the pit.	–	–	1	–	–	1
Aug. 3	22	Stonecrags Coltness.	Wishaw - -	Coltness Iron Co. -	Jas. Thomson -	Collier -	20	Fall of roof (coal). Seam 9 feet high.	–	1	–	–	–	1
„ 6	23	Limerigg -	Slamannan -	Robert Baird - -	Thos. Maxwell -	Sinker -	—	Struck on head by the plumb-bob (about 4 lbs.) falling off the end of the line. He died 10 days afterwards.	–	–	1	–	–	1
„ 10	24	Stevenston -	- - -	Stevenston Coal Co. -	Jas. Clark -	Collier -	40	Fall of coal of side of a stoop while taking out pillars. Coal 3 feet thick. Roof sandstone.	–	1	–	–	–	1
Sept. 16	25	Lochgelly (Raith)	Lochgelly -	Lochgelly Iron Co. -	Will. M'Caig -	Ditto -	50	These men were sitting at breakfast about 20 feet back from the face of their room, when the roof (about 12 inches of coal) fell suddenly upon them.	–	1	–	–	–	1
					Jno. Yeats -	Ditto -	52		–	1	–	–	–	1
„ 23	26	Carron -	Falkirk - -	Carron Iron Co. -	W. Wilson -	Driver -	12	Fell when running between his horse and a race of tubs, and the hutches ran over him.	–	–	–	1	–	1
								Carried forward -	1	18	4	3	1	27

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost in Coal Mines.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
								Brought forward -	1	18	4	3	1	27
1868. Oct. 2	27	Dalkeith -	Dalkeith - -	Duke of Buccleuch -	— Hope - -	Engineman	70	He stepped on the connecting rod when the engine was in motion, and got his foot jammed between it and the wall. This man had worked the same engine for 30 years, and it is said had frequently been so reckless as to do what at last cost him his life.	–	–	–	–	1	1
Oct. 9	28	Orbiston -	Bell's Hill -	Mossend Iron Co. -	D. Hanigan -	Sinker -	31	He was working in the bottom of this sinking pit, and something fell down and struck him on the head.	–	–	1	–	–	1
„ 12	29	Parkhead -	Motherwell -	John Watson - -	Robert Wilson -	Manager -	52	Explosion of a steam boiler -	–	–	–	–	1	1
„ 24	30	Whitehill -	Dalkeith -	Archd. Hood - -	D. Dubie -	Pony driver	15	Run over by tubs - -	–	–	–	1	–	1
„ „	31	Prestongrange	Prestonpans -	Sir George Suttie - -	R. Sneddon -	Collier -	60	He was underholing, and the coal rolled over upon him. Seam 52 inches worked longwall.	–	1	–	–	–	1
„ 28	32	Binniehill -	Slamannan -	John Watson - -	J. McEwan -	Ditto -	22	Roof fell on him while holing. Coal 26 inches thick; roof sandstone. Worked by longwall.	–	1	–	–	–	1
„ 30	33	Blackbraes -	Falkirk - -	Jas. Russel and Son -	J. Chalmers -	Ditto -	35	They were descending the pit to examine something at the bottom, when the rope (a round wire) broke.	–	–	1	–	–	1
					John Sneddon -	Ditto -	22		–	–	1	–	–	1
Nov. 11	34	Cleugh -	Wilsontown -	Wm. Darling's Trustees -	Jas. Watson -	Ditto -	30	He worked in a place out of hearing of neighbours; some stones fell on him so that he could not extricate himself, and he lay (not much injured) for 24 hours till relieved. Died from exposure next day.	–	1	–	–	–	1
								Carried forward -	1	21	7	4	3	36

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.								Brought forward -	1	21	7	4	3	36
Nov. 12	35	Haywood -	Wilsontown -	Haywood Coal Co. -	M. Steel - -	Overman -	45	Fall of roof while knocking out props.	–	1	–	–	–	1
„ 13	36	Prestongrange	Prestonpans -	Sir George Suttie -	Thos. Archibald -	Drawer -	14	The roof fell on him while pushing his tub out main road.	–	1	–	–	–	1
„ „	37	Benhar -	Linlithgow -	George Simpson - -	A. Hailstones -	Ditto -	14	Knocked against a prop by collision with another drawer, injured internally, and died next day.	–	–	–	1	–	1
Dec. 2	38	Tennochside -	Coatbridge -	Monkland Iron Co. -	D. Hannan -	Sinker -	23	He was struck by a stone which fell off side of pit.	–	–	1	–	–	1
„ 5	39	Stepends -	Airdrie - -	Summerlee Iron Co. -	J. Parkes - -	Collier -	43	Was holing his coal, when stone fell from roof. Seam 30 inches; roof sandstone. Worked longwall.	–	1	–	–	–	1
„ 22	40	Sheardale -	Clackmannan -	James Wingate - -	J. Wingate -	Manager -	27	He was descending a pit on a crane rope, the end of which was insufficiently attached (by himself) to the barrel. It surged, and he fell off.	–	–	1	–	–	1
„ 30	41	Riggside -	Douglas -	James Swann - -	A. Wilson -	Miner -	40	A piece of stone fell off wall side and killed him.	–	1	–	–	–	1
									1	25	9	5	3	43
List of Fatal Accidents and Loss of Life in Ironstone Mines.														
Sept. 23	42	Polkemmet -	Bathgate -	Sholla Iron Company -	Jas. O'Brien -	Labourer -	31	Fell in among machinery, taking a "short cut" to the pithead from the engine house.	–	–	–	–	1	–

Mr. Alexander's Report.

Report upon the Inspection of Mines in the Western District of Scotland, for the Year ended 31st December 1868.—By William Alexander, Esq.

Sir, Glasgow, February 27, 1869.

I have the honour to lay before you my Thirteenth Annual Report upon the mines and collieries in the west of Scotland.

In preparing these periodical statements the labour would be of a more agreeable kind if the information requiring to be submitted referred only to the extension of works, the modes of exhaustion practised, and the changes and improvements which are from time to time being introduced into the various mineral fields. Each succeeding year, however, brings round its painful record of fatalities, slightly varied in detail, but always showing forcibly to what extent the everyday life of those who toil in mines is beset with dangers over which, in many cases, they have little or no control. The consideration, therefore, of loss of life, and how to prevent it, must always take a prominent place in the reports of an inspector.

Notwithstanding the many painful occurrences which for the year now ended have to be deplored, it must be a subject of thankfulness, that while saddening disasters have ravaged busy centres of industry in other localities, no extensive or wide spread calamity has taken place among the collieries of this district.

For the past year the number of collieries in operation has been 203. The persons employed in and about them were 21,160, and I estimate the total produce of coal and dross at 6,253,875 tons.

The fatal accidents connected with these works were 40, causing the loss of a like number of lives. Of these, 18 were married men, whose untimely death left 18 widows and 28 fatherless children unprovided for, 15 were single or unmarried, and 7 were boys.

The accompanying Schedule No. 1. will briefly explain in what way these unfortunate occurrences took place, and the following is an abstract of it.

Year.	Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous and above ground.	Total loss of Life.
1868	4	20	7	9	40

Proportion of Lives lost to the Number of Persons employed and the Tons of Coal raised.

Persons employed.	Quantity of Coal produced.	Lives lost.	Persons employed per Life lost.	Tons of Coal raised per Life lost.	Loss of Life per Million Tons of Coal raised.
21,160	6,253,875	40	529	156,346	6·3

Though the number of fatal accidents for the past year has been slightly in excess of 1867, it is still under the general average, and compares with former years favourably.

The loss of lives from explosions of fire-damp were four, and of these at least three happened through recklessness and neglect. The quantity of gas causing the accident in each case was trifling, and with one exception the sufferers survived their injuries for some days after. I have nothing new to suggest as to the prevention of such accidents, it is

vexatious to think that they should have occurred at all, and I can only repeat the observations made in former reports, that a more stringent observance of the special rules would prevent the recurrence of all such distressing events. One of the most important precautions in connexion with this branch of mine management, is to carry out a systematic examination of the working places every morning before the workmen are allowed to enter them ; and I find that the best way to do this is to provide that the engineman shall not allow the descent of workmen into the colliery on any morning till after the fireman has made his underground examination, and has signalled to the surface to that effect. With this precaution, however, there is still the difficulty of proving or knowing that the fireman has faithfully performed his duty ; and in some cases of non-fatal explosions which I have had occasion to investigate, reasonable doubts have been entertained as to the truthfulness of the fireman's report that an examination was made at all. It would narrow the likelihood of such an omission, and form a satisfactory check, if an additional rule was introduced, compelling the fireman each morning to leave his mark, or the date of examination with chalk, on the face of the coal in every working place.

The accidents from falls of coal and roof, exactly 50 per cent. of the whole, are rather under the average of bygone years, and, with two exceptions, they happened to the sufferers while working at the coal face or while engaged taking down part of the roof and securing it. The duty devolves entirely upon the workmen to protect themselves from falls of roof within a given distance of the face of their working places, and a decrease in this class of accidents may fairly be attributed to greater care on their part. The immunity from casualties of this description appears to be much greater in mines where the "longwall system" is practised ; and though more than a half of the coal has been raised by *that method*, for the period to which this report refers, 80 per cent. of the fatal accidents from falls of coal and roof happened in mines worked by the "stoop and room" system.

In shafts the accidents are also under the average of former years. Three fell away from the cage or kettle on which they were being lowered or raised ; two fell from the surface ; one was thrown off a scaffold while making repairs in the shaft ; and another by mistake pushed a hutch into the wrong division of the shaft, and fell to the bottom with it. It is discouraging year after year to have to call attention to loss of life in the way last described ; and if a general rule were introduced, enforcing the use of self-acting guards or wickets at *all pits* where coals are put out, this description of accident would forthwith cease to be heard of.

The fatal accidents miscellaneous and above ground have been unusually numerous and much in excess of the average of past years. They do not come under any general head, but exhibit strikingly the many ways in which accidents happen to persons employed in and about mines. One was kicked by a horse ; two got entangled with pumping machinery ; one fell a few feet from a scaffold on the surface ; two were run over by loaded hutches ; one was crushed under machinery while assisting to load it into a railway waggon ; and two were burnt and bruised by gunpowder while blasting.

In ironstone mines of the coal measures, and worked in connexion with coal or with any disused or exhausted coal mine, the fatal accidents were four. Of these, two were occasioned by falls of roof ; one by the breakage of a crane rope ; and one by a stroke from his "pinch" or lever, which slipped while he was using it to force off a piece of ironstone at the face of his place. Though the majority of the ironstone mines do not come within the scope of the Mines Inspection Act, the accidents which occur in them are nearly every one reported to me, either by the owners of the mines or the Crown Agent. I examine into and report as to the cause of accident in nearly every case, but it is only those which come under the statute that are entered in Schedule No. 2.

The accidents of a non-fatal kind which have been reported from every description of mine were 237.

Explosions of fire-damp	80
Falls of coal, ironstone, and roof	112
In shafts	16
From miscellaneous causes and above ground	29

Comparing them with those of a fatal kind they are nearly six times more numerous, and in glancing over the long list it is cheerless to think of the distress and protracted suffering which must in many instances have resulted from them.

Improvement in the working details of the collieries generally, though not accompanied by a marked diminution of loss of life, is gradually advancing, and the mines of 1868 are unquestionably superior in point of management and skilful appliances to those of 20 years ago. The standard of good management is not, strictly speaking, to be

measured by the amount of loss of life, for it is a well-known fact that the greatest number of accidents do not always happen in the *worst* managed mines. There is something connected with underground labour incompatible with safety; and we have it from undoubted statistics that a certain number of lives will be lost annually, ranging from five to ten, for every million tons of coal raised. What the *real* amount of risk is, independent of recklessness on the part of the sufferers or neglect on the part of the management, will probably vary in different mineral fields, but I believe that it will be a long time before the fatalities in the mines of this country will average fewer than five or six for every million tons of coal raised; and in the most favourable situations, and with the greatest care, not less than four. There is another point of view, however, and perhaps a more cheering one, from which to measure the progress of improvements as affecting life, and that is to consider whether the average age at which persons continue to labour in mines has not been extended.

I cannot adduce evidence of a satisfactory kind, but I am of opinion that it has been lengthened, and in support of this I refer to Schedule No. 1, which shows that from a sixth to a seventh of the fatal accidents which took place in 1868, happened to persons while labouring in and about mines whose ages averaged 64, and ranged from 60 to 69 years.

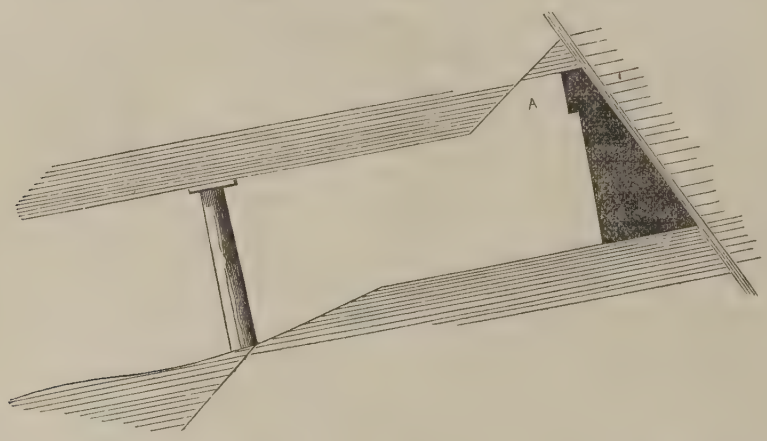
The duration of the coalfield, and how to economize it, has now become a subject of interest, and as old leases expire more stringent regulations are introduced into new ones, principally relating to the modes of working, and, occasionally, the *order* in which the seams are to be worked. The matter is entirely in the hands of the proprietors of lands and their advisers, and probably it would tend to systematise arrangements if some recognized and judicious system were strongly recommended, which, without interfering with private rights, would have a tendency to check or guard against any unnecessary waste of this invaluable source of national wealth. The modes of working coal are "stoop and room" and "longwall." The former admits of endless variety of procedure; in some cases pillars of coal are formed with the view of being afterwards taken out, wholly or in part, and in other cases the tenant is held bound to leave a given proportion of the coal for the purpose of maintaining the roof and surface; but by the latter, while there may be slight variations in the mode of extraction, still the important result is in nearly all cases the same, the *whole* of the coal is obtained, and in the best marketable state. The more stringent regulations referred to consist mainly in defining that certain seams shall be worked by "longwall," or that a system of forming pillars at first working shall be carried out, so as to give a reasonable security that they shall be afterwards worked away, or, if temporarily abandoned, *not lost*. Apparently there are few seams so situated as to prevent the introduction of the "longwall" method; and in practice I find that this judicious system is carried out in every description of seam, and under an endless variety of conditions. It is a lucky circumstance in this case that the mode of working best adapted for economizing the seams of coal is also the safest in so far as relates to falls of coal and roof, that constant source of accidents in all mines; and it is important to know that though upwards of a half of the coal got in this district during the past year was by the longwall system, only 20 per cent. of the lives lost by falls of coal and roof took place in such mines. These unfortunate occurrences go on without intermission, and seem very little affected by the means hitherto adopted to prevent them, but if by changing the system of working a greater immunity from accidents could be obtained for the persons who work in mines, and a more complete exhaustion of the coalfield carried out, then the subject is well deserving of attention, and ought to enlist the interest of both the economical and humane.

At times when unusual disasters occur in mines much sympathy is manifested for the sufferers among all classes throughout the country, and the question of how best to relieve them in such cases has of late been attracting the attention of the sympathising and kind. It would be a great achievement if some well-devised scheme of universal application could be introduced, calculated to alleviate such awful calamities, and partially lighten the gloom thrust so suddenly on many a bereaved home; and probably the most practical and least objectionable would be a general system of insurance to which every underground workman should be compelled to contribute, supplemented by public and private contributions from the owners of mineral estates, colliery owners, and gentlemen of wealth and influence, so comprehensive as to assist the disabled and to provide for the widows, the fatherless, and orphans of all who may lose their lives while engaged in or exposed to the risks and dangers of the mine.

Though there is not much occasion for special remark upon any of the accidents which happened, it may be useful to detail a few of the more prominent cases, and explain the peculiar circumstances under which they took place.

Accident No. 2. *was occasioned by an explosion of fire-damp.*

The deceased, who was a collier, had been engaged on the morning of the accident for three hours or thereby in his working place, and worked with an open or unprotected light. The place he was extending was near to a dislocation two fathoms down, and he had just driven through a small hitch of 18 inches up, a few feet back from the face. As to how the accident occurred, it appears that the deceased had gone out with his "drawer," a boy, to assist him a short distance with a loaded hutch, and on returning to his place, ignited a little gas which had collected during the few minutes he was absent. A very small part of the "head coal," A, as per sketch, inside of the 18-inch hitch, had been taken down shortly before the accident, and the gas which was ignited had apparently gathered in that small opening.



Accident No. 4. *was occasioned by the deceased getting entangled with the underground machinery.*

There is a small engine situated near to the bottom of this pit, and the steam used by it is produced on the surface. The deceased was an assistant engineman. At the time of the accident he was engaged on the night shift, when the surface and underground engines were engaged pumping water. The steam being produced on the surface, the underground engine, when once started to pump water, did not require constant attention further than keeping it moving at the speed required to raise the drainage of the dook. It was the duty of the deceased to visit the underground machinery occasionally, perhaps five or six times during the night, and he was lowered and raised by the winding machinery. Some time before the accident it appears that he had been lowered to the bottom of the pit in the usual way. The engineman, his neighbour, observing that he remained unusually long, went down a "stair" pit to learn the cause of delay, and on reaching the machinery found him lying crushed between the fly-wheel and a cutting formed in the pavement, in which the lower part of the fly-wheel revolved. It is supposed that the deceased had, after being lowered to the bottom of the pit, proceeded down the dook to examine the state of the water in it. His lamp was found about mid-way down, and it is presumed that it had fallen or the light gone out, and in afterwards approaching the machinery without a light, he had unexpectedly got entangled with it. The deceased was 68 years of age, and though he was considered competent, it would have been more satisfactory if a younger person had been appointed to perform the duties.

Accident No. 10. *was occasioned by the deceased falling out of the cage while being raised.*

The deceased at the time of the accident was being raised on the cage, along with other three workmen, and when about mid-shaft he fell from it suddenly to the bottom of the pit, a distance of 42 fathoms. I learned afterwards that the unfortunate sufferer had been subject to convulsive attacks, and it is supposed that he had been seized by one at the time the accident happened. It would be prudent I think to prevent such persons from going into mines unless under special regulations.

Accident No. 16. *was occasioned by an explosion of fire-damp.*

According to the special rules of the colliery, it was the duty of the fireman to descend the pit before the colliers shift commenced, and to proceed through every

drawing road and along the whole coal-faces and working places in the colliery, and minutely examine the same, &c. It appears that the fireman did descend the shaft on the morning of the accident, and, as the pit was not expected to be worked fully for the day, according to his own statement, he examined only two or three of the working places. He afterwards had occasion to go with the deceased, who was to assist him to make some changes in one of the usual working places, but which had not been examined, and ignited a quantity of fire-damp, by which the deceased was severely burned and died from the effects of it.

The fireman in this case was charged by the Procurator Fiscal of Ayr with culpable homicide, as also culpable neglect of duty; he was tried by the sheriff and a jury, when he pled guilty to culpable neglect of duty, and was sentenced to four months imprisonment.

Accident No. 17. *was occasioned by the deceased attempting to leap off the cage after it was raised a little above the usual landing.*

In this case, the cage had been lifted a little higher than the usual landing when men were being raised, and the deceased, who was on it along with two neighbouring workmen, leaped off while it was in motion, and on to the platform at the pit-head, where unfortunately he overbalanced and fell back into the shaft. The other workmen remained upon the cage, and got off it safely a few feet higher up.

There was something unsatisfactory and irregular with regard to the signals, and though a bottomer was employed to see the hutches placed carefully upon the cage, and to make the necessary signals, he had frequently allowed the workmen to make the signals themselves. The engineman excused himself by saying that only one signal had been made, and in consequence thereof, less caution was observed than if he had been aware that men were being raised upon the cage.

Accident No. 21. *was occasioned by the upsetting of a piece of machinery while loading it into a railway waggon.*

The deceased was the foreman engineer at the colliery; he was engaged with others at the time of the accident loading some machinery into a railway waggon, when a crank weighing about six cwts., suspended by a crane rope, canted suddenly while being lowered, and the deceased was crushed under it.

Accident No. 24. *was occasioned by the deceased falling from a scaffold while engaged repairing the guide rods in the shaft.*

It appears that the "guide rods," or wooden conductors, in the shaft had got displaced by the guides upon the cage getting out of place. The deceased and two others, the oversman being one of them, had been engaged for 12 or 14 hours before the accident happened making the necessary repairs upon the shaft, and for that purpose a scaffold was suspended by chains from the bottom of the cage, and hanging about 20 feet below it, for them to stand upon. With the exception of their tools, there was no other weight upon the scaffold except two guide rods, the one 18 and the other 9 feet in length. I understand that the 18 feet length rested upon the scaffold at one end, and was lashed to one of the chains about 8 feet above the level of the scaffold. The accident was occasioned by the scaffold breaking or giving way right along the centre.

The oversman and his neighbour kept their places, or rather held on by the sides of the scaffold, and after great exertions reached the cage by climbing up the "buntons," but the deceased fell from the scaffold to the bottom, a distance of 80 yards. The construction of the scaffold was faulty, and since the accident, cross bars of iron have been added for the purpose of strengthening it.

There was some uncertainty as to the real cause of accident. I was of opinion that it had been occasioned by the guide rod 18 feet long, above referred to, getting displaced or hanging out at the top, and when the cage was raised, such as was being done when the accident happened, it came in contact with the midwall, and forced the scaffold asunder.

Accident No. 26. *was occasioned by an explosion of fire-damp.*

The deceased, who was the general manager, had on the day of the accident gone in company with the fireman to examine a block of coal near to the pit bottom, with the view of advising as to the mode of working it out. There was an air-course near to it, and as they had occasion frequently to go into the place it was not considered necessary

to use the precaution of making an examination with a safety lamp before entering it, and they used open lights. In the course of their examination they ignited a small quantity of gas at a "cutter." The space where they had to travel in was contracted; the fireman made his way out and escaped, but the deceased unfortunately got affected by the gases and combustion, and was left behind. The flame from the cutter communicated with the dry wood, coal, and other loose materials in that part of the mine, not more than 80 or 100 yards from the pit bottom, and though repeated attempts were made to reach the deceased, they proved unsuccessful, and as a last resource the shafts and outlets were closed. Trivial though the matter appeared to be at first, it was some weeks after before the fire was subdued, and when an exploration was made, what was supposed to be the charred remains of the deceased were found not more than 60 yards from the pit bottom. Apparently he had got stupefied or confused by the sudden rush of flame in the contracted course and missed his way.

Accident No. 32. *was occasioned by the deceased getting entangled with the crank of the pumping engine.*

The deceased was engaged as an assistant engineman. It appears that on the night of the accident he had gone to his work in the usual way, there was no one along with him at the time, and about half an hour after he had entered upon his shift he was found lying crushed under the crank of the engine. It was imagined that he had been working about the valve of the "feed pump," when by some overlook on his part his dress had got entangled with the crank of the engine, and he was drawn round with it and crushed against the sides of the recess formed in the floor, in which the crank revolved.

Accident No. 35. *was occasioned by the deceased pushing a hutch into the wrong division of the shaft and falling to the bottom with it.*

In this case the deceased was an assistant pit headman, he had been to the "bing" with a hutch of coals, and on returning with the empty hutch instead of putting it on to the cage to be returned in the ordinary way, he pushed it into the wrong division of the shaft, and fell to the bottom with it. Such accidents occur, I believe, through a kind of forgetfulness or momentary absence, and happen to experienced workmen. There is no way of preventing them but by introducing moveable guards at the pit-mouth, which form a perfect protection when the cage is not there.

Accident No. 36. *was occasioned by an explosion of fire-damp.*

It appears that a stone mine had been in the course of extension for a considerable time, but for a day or two previous to the accident it had been discontinued on account of an excess of gas. The roadway leading into deceased's place passed by the end of the stone mine. It seems to have been well known to him, and those who worked in the same limited district with him, that fire-damp existed in the mine, and that it had been partially stopped until an opening, a small "blind pit," could be put down upon the end of it to form a better circuit for the air. Notwithstanding, the deceased went into within a few feet of the face of the mine with an open light, and ignited the gas, by which he was burned; at first, it was not supposed to be seriously, but he died from the effects of it about a week after. It is difficult to know whether in this case a fence would have prevented the accident. By the second general rule it was the duty of the owner to use such a precaution, but he failed to do so.

I have, &c.,
(Signed) WILLIAM ALEXANDER,
Inspector of Mines.

To the Right. Hon. H. A. Bruce, M.P.,
Principal Secretary of State,
London.

SCHEDULE No. 1.

List of the Fatal Colliery Accidents, and Loss of Life arising therefrom, in the Western District of Scotland, during the Year ended 31st December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Jan. 6	1	Barleith, No. 4 Pit	Kilmarnock -	John Galloway and Co. -	Adam Irving -	Pony driver	15	By a kick from the pony he was driving.	–	–	–	1	–	1
„ 8	2	Summerlee, No. 3	Coatbridge -	Wilsons and Co. - -	John Hamilton -	Collier -	60	Explosion of fire-damp - -	1	–	–	–	–	1
„ 14	3	Provanhall, No. 5	Baillieston -	Provanhall Coal Company	Robert Paterson -	Drawer -	16	Fall of roof on main drawing road -	–	1	–	–	–	1
Feb. 10	4	Bannockburn -	Bannockburn	Mrs. Geddes - -	Alexander Stevenson	Assistant engineman.	68	Got entangled with the underground machinery.	–	–	–	1	–	1
„ „	5	Newton - -	Cambuslang -	J. P. Kidston - -	Richard Sneddon -	Manager -	62	By falling a few feet off a scaffold at the pit head.	–	–	–	–	1	1
„ 14	6	Grougar, No. 3 -	Galston -	Portland Iron Company -	John Cowan -	Boy - -	13	Fall of stone at face - - -	–	1	–	–	–	1
„ 15	7	Drumpeller, No. 2	Coatbridge -	Wilsons and Co. - -	William Eccles -	Miner -	40	Fall of roof while forming a lodgment off a sinking pit.	–	1	–	–	–	1
„ 26	8	Neilston, No. 1 -	Kilsyth -	James Wallace and Co- -	Joseph Jarvie -	Collier -	40	Fall of coal at face - - -	–	1	–	–	–	1
„ 28	9	Bredisholm, No. 4	Baillieston -	Charles Tennant and Co. -	William Frame -	Boy - -	15	Fall of roof at face while engaged undermining.	–	1	–	–	–	1
Mar. 1	10	Govan, No. 3 -	Glasgow -	W. S. Dixon - -	Archd. Maxwell -	Collier -	19	Fell out of the cage while being raised.	–	–	1	–	–	1
„ 7	11	Kilwinning, No. 2	Kilwinning -	Eglinton Iron Company -	Thomas Elliot -	Boy - -	15	Fall of roof about 10 faths. from the face.	–	1	–	–	–	1
„ 9	12	Kirkwood, No. 2 -	Coatbridge -	John Hendrie - -	Thos. Mackie -	Drawer -	23	Was run over by a loaded hutch	–	–	–	1	–	1
„ 17	13	Neilston, No. 1 -	Kilsyth -	James Wallace and Co. -	David Shaw -	Collier -	12	Fall of roof at face - - -	–	1	–	–	–	1
„ 30	14	Drumpark, No. 1	Baillieston -	Drumpark Coal Company	James Weir -	Drawer -	14	Fall of coal at face - - -	–	1	–	–	–	1
April 7	15	Hillhead, No. 2 -	Airdrie -	William Baird and Co. -	Pat Fowley -	Collier -	18	Explosion of gunpowder - -	–	–	–	1	–	1
„ 8	16	Armsheugh -	Irvine -	Merry and Cunningham -	James Holdon -	Ditto -	45	Explosion of fire-damp - - -	1	–	–	–	–	1
„ 29	17	Meiklehill -	Kirkintilloch -	James Gairdner - -	George McKay -	Ditto -	22	Fall of roof while repairing a roadway.	–	1	–	–	–	1
								Carried forward -	2	9	1	4	1	17

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
								Brought forward -	2	9	1	4	1	17
1868. May 5	18	Bartonholm, No. 2	Kilwinning -	Eglinton Iron Company -	John Johnston -	Collier -	23	Fell down the shaft when attempting to leap off the cage after it was raised a little above the usual level.	–	–	1	–	–	1
„ 18	19	Hurlford, No. 12	Hurlford -	Allan Gilmour and Co. -	James Turnbull -	Ditto -	24	Fall of coal when in the act of taking it down.	–	1	–	–	–	1
„ 25	20	Stottencleugh Mine	Muirkirk -	Eglinton Iron Company -	Wm. McWhirter -	Boy - -	14	Injured by a hutch upon a drawing road, and died a few days after.	–	–	–	1	–	1
June 2	21	Kilgramie -	Girvan -	Joseph Whitefield -	Hugh Croally -	Collier -	60	Fall of coal and roof - - -	–	1	–	–	–	1
„ „	22	Canobie - -	Canobie -	Duke of Buccleuch -	James Forrat -	Foreman engineer.	42	Was crushed while loading machinery into a railway waggon.	–	–	–	–	1	1
„ 16	23	Bogleshole, No. 4	Tollcross -	James Dunlop and Co. -	Pat. Newman -	Brusher -	23	While engaged blasting with gunpowder.	–	–	–	1	–	1
„ „	24	Espieside, No. 3 -	Coatbridge -	Wm. Baird and Co. -	James Easton -	Collier -	37	Fall of coal, died a week after the accident.	–	1	–	–	–	1
„ 27	25	Redan - -	Stevenson -	Merry and Cunningham -	Frank Mullen -	Ditto -	30	Fall from a scaffold while repairing the guide rods in the shaft.	–	–	1	–	-	1
July 1	26	Cairnhill, No. 5 -	Airdrie -	Wm. Baird and Co. -	R. Hamilton -	Sinker -	32	Fell off the kettle while being raised in the shaft.	–	–	1	–	–	1
„ 14	27	Strone - -	Kilsyth -	Richard Brown - -	Alex. Lorimer -	Manager -	36	Explosion of fire-damp - - -	1	–	–	–	–	1
„ 16	28	Espieside, No. 5 -	Coatbridge -	Wm. Baird and Co. -	Nicol Stewart -	Collier -	30	Fall of roof - - - - -	–	1	–	–	–	1
„ „	29	Common -	Cumnock -	William Walker - -	James Park -	Ditto -	43	Fall of roof at face - -	–	1	–	–	–	1
Aug. 24	30	Dalquharran -	Maybole -	T. F. Kennedy - -	Thos. McClusky -	Sinker -	44	Fell from a kettle whilst descending the shaft.	–	–	1	–	–	1
„ 29	31	Byrehill - -	Kilwinning -	Eglinton Iron Company -	Robt. Perrie -	Collier -	69	Fall of coal at face - - -	–	1	–	–	–	1
„ „	32	Auldhouseburn -	Muirkirk -	George Vallance - -	Wm. Stevenson -	Ditto -	67	Fall of coal while engaged taking it down.	–	1	–	–	–	1
Sept. 14	33	North Boig -	N. Cumnock -	Lanemark Coal Company	Adam Dickie -	Engineman	23	Found crushed under the crank of the pumping shaft.	–	–	–	–	1	1
								Carried forward -	3	16	5	6	3	33

List of Fatal Colliery Accidents—*continued*.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost. Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
								Brought forward -	3	16	5	6	3	33
1868. Sept. 22	34	Dalharco, No. 2 -	Dalmellington	Dalmellington Iron Co. -	James Dickson -	Brusher -	28	Fall of roof while engaged taking it down.	–	1	–	–	–	1
Oct. 19	35	Opencast, No. 2	Coatbridge -	Wm. Baird and Co. -	George Clarkson -	Collier -	48	Fall of coal at face - - -	–	1	–	–	–	1
Nov. 6	36	Portland, No. 5 -	Hurlford -	Eglinton Iron Company -	Alex. McDonald -	Hillman -	54	Fell down the shaft by pushing a hutch into the wrong division of it.	–	–	1	–	–	1
„ 16	37	Neilston, No. 2 -	Kilsyth -	James Wallace and Co. -	James Britton -	Collier -	19	Explosion of fire-damp - -	1	–	–	–	–	1
Dec. 3	38	Wellwood -	Muirkirk -	Eglinton Iron Company -	Hugh McLachlan -	Ditto -	45	Fall of coal at the face - - -	–	1	–	–	–	1
„ 9	39	Neilston, No. 2 -	Kilsyth	James Wallace and Co. -	Thos. McKay -	Ditto -	30	Fall of roof at the face - -	–	1	–	–	–	1
„ 28	40	Solesgirth -	Kirkintilloch -	Ditto - - -	Jas. Gilmour -	Pitheadman	16	Fell down a (sinking) pit - -	–	–	1	–	–	1
									4	20	7	6	3	40

SCHEDULE No. 2.

LIST of the FATAL ACCIDENTS in IRONSTONE MINES, and LOSS OF LIFE arising therefrom, in the WESTERN DISTRICT of SCOTLAND, during the Year ended 31st December 1868.

Date.	No. of Accidents.	Name of Mine.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost in Ironstone Mines.					
									Explosions.	Falls of Iron-stone and Roof.	In Shafts.	Miscellaneous.	Above ground.	Total.
1868.														
Feb. 28	1	Riskend - -	Kilsyth -	W. Baird and Co. -	Peter Quin -	Miner -	36	Fall of roof at face -	–	1	–	–	–	1
May 20	2	Barriston -	Campsie -	Wishaw Iron Company -	Thos. Paterson -	Ditto -	20	Fall of ironstone - - -	–	1	–	–	–	1
July 24	3	Faskine, No. 8 -	Airdrie -	W. Baird and Co. -	Wm. Ashwood -	Ditto -	58	Was struck by his "pinch," which slipped while he was forcing off a piece of ironstone at the face.	–	–	–	1	–	1
Oct. 10	4	Gartshore, No. 3	Kilsyth -	Ditto - - -	James Collins -	Drawer -	36	Fell from the cage by the crane rope falling upon him.	–	–	1	–	–	1
									–	2	1	1	–	4

Mr. Southern's Report.

REPORT on the INSPECTION OF MINES in the NORTHUMBERLAND, NORTH DURHAM, and CUMBERLAND DISTRICT, from the 31st December 1867 to the 31st December 1868.—By GEORGE WILLIAM SOUTHERN, Esq.

SIR, Newcastle-on-Tyne, February 27, 1869.

I HAVE the honour, as Inspector of Mines for the Northumberland, North Durham, and Cumberland inspection district, to transmit to you the following, as my Report with reference to the operation of the Mining Inspection Act during the year ending 31st December 1868.

Appended to this, my annual Report, is a detailed list of fatal colliery accidents, that have occurred in the district during the year, and which I am happy to say shows a decrease (although small) of four in the number of separate accidents, and also a decrease of 12 in the number of deaths resulting therefrom, as compared with the former year.

As will be seen by the list alluded to, the causes and numbers of accidents and deaths have been:—

	Separate Accidents.	Number killed.	Total, separate Accidents.	Total Deaths.
From Explosions of fire-damp	3	3	—	—
Falls of Coal and Stone.				
Falls of coal	4	4	—	—
Do. of stone	24	26	—	—
In Shafts.				
Over-winding	—	—	—	—
Ropes or chains breaking	1	1	—	—
Whilst ascending or descending	7	7	—	—
Falling into shaft from top	2	2	—	—
Falling from part way down	3	3	—	—
Things falling down shafts	3	3	—	—
Sundries in shafts	—	—	—	—
Miscellaneous Underground.				
Explosions of gunpowder	—	—	—	—
Suffocation by gas	1	1	—	—
Irruption of water	—	—	—	—
Falling into water	—	—	—	—
On incline and engine planes	2	2	—	—
By Trams or tubs underground	10	10	—	—
Machinery underground	—	—	—	—
Sundries underground	1	1	—	—
			61	63
On Surface.				
Machinery	—	—	—	—
Boilers bursting	—	—	—	—
Sundries	6	6	6	6
Total			67	69

The above table shows that the number of accidents and deaths resulting from explosion of gas is not more than three, which from the fiery nature of a large portion of the district is a circumstance affording me very much pleasure in reporting, particularly when it is considered, that during the last few months of the year, the state of the barometer was very variable, a condition of things tending from experience to show a more than ordinary liability to accidents of that nature.

The number of accidents and deaths from falls of coal and roof, is a little below the average.

The shaft accidents are high in number, and of a more miscellaneous character than those of last year.

The accidents which have occurred on incline planes, and by trams and tubs, are much below the average, and have resulted mainly from carelessness or fool-hardiness on the part of the sufferers themselves. The accidents on the surface, during the year, have also, I am happy to say, not been numerous.

The total number of accidents last year in this district has been 67, and of deaths 69; and for the previous year 71 accidents, and 81 deaths.

Explosion of Gas.

From this cause three deaths have been occasioned during the year, and from three separate accidents; the first, No. 14 on the list, was caused by the overman of the Asby Colliery imprudently going into a place not in use, with a naked light, and there being explosive gas present it was ignited and caused his death.

The second, No. 19 on the list, was caused by a small blower of gas coming off at a gullet in the roof, in the workings of the North Seaton Colliery, from which there had been an outburst of water, on the subsidence of which gas was given off, and unfortunately a hewer working in an adjoining place, through curiosity, went shortly after the gullet or fissure had been pricked, to see it, and placing his candle close to the break fired the gas, and although not seriously burnt, as was supposed at the time, was sufficiently so, with exposure to the air afterwards, as to cause his death. The quantity of air in this mine is altogether 110,000 cubic feet per minute; and of this there was 15,000 cubic feet per minute, going into the way in which the accident occurred, it being afterwards split into nearly equal portions, so that about 7,000 cubic feet per minute were used for ventilating the particular part of the workings where it happened.

The third, No. 34 on the list, occurred at Ouston Colliery, to a deputy-overman, who had gone into an old board to seek a sleeper, for the purpose of putting it in a working place, when, a fall of the roof having previously taken place, explosive gas had lodged in the cavity formed by the fall, and was ignited by his light, thereby causing his death.

Falls of Coal and Stone.

Accident No. 23 on the list, occurred to Elisha Whitehouse, who was killed by a fall of stone at Cramlington Colliery.

From the evidence of a hewer, who worked in a place adjoining that in which the deceased was employed, it appeared that he had been in the place where the accident happened, about an hour before the occurrence, and noticed a slip in the roof, and thought a trouble was being approached; he said there was plenty of props in the place ready for use, for their safety. Shortly before the accident a shot had been fired to blast some coal down, but which was not immediately effective, and it was supposed that on the deceased returning to the face (from which he had necessarily retired during the firing of the shot) the coal had fallen, and, owing to the slip named in the roof, a portion of stone fell along with it, and which, falling upon Whitehouse, caused his death.

The fatal accident No. 26 occurred at the bank head of an incline plane in the West Sleekburn, one of the Bedlington Collieries, and caused the death of two boys employed there. At the inquest, George Morgan, a hewer, stated in evidence, that he had for some time previously passed under the stone twice a day, and observed nothing wrong; that when it had fallen it showed a slip in the roof, causing the stone to be what is called a horse-back. Thomas Croudace, the under viewer of the colliery, stated that the place was, up to the time of the accident, in a similar position to what it had been for 10 or 12 years previously, and that he had last seen it eight days before the occurrence, when he saw nothing amiss; but, from inquiry, I found that the planks or crown trees had been placed longitudinally, and which, although considered sufficient for that place, I advised that, for the future, they should, in places similarly situated to that where the accident happened, be placed the reverse way, or at a right angle to the direction of the slip, in order to prevent the chance of their being canted, as in this instance; and which he promised should be attended to.

Accident No. 31 took place at Usworth Colliery. The evidence showed that a deputy had been in the working place a short time before the occurrence, and timbered it up, as near the face as he could get it; but, in the course of working the coal, the

deceased had subsequently bared the roof sufficiently to cause a fall of stone, which had come away suddenly at a slip in the strata.

Accident No. 40 occurred at North Seaton Colliery, from a fall of what is called following stone, a portion of the roof which is separated from the over-lying strata by a parting, this parting being in some cases so clear as to cause the following stone to fall with the coal, when the latter is excavated, or to be easily taken down by the workmen afterwards; when this is not so, then it is secured by propping. The district of the mine in which this accident occurred having a roof of this nature, it necessarily happens that much is left for their safety in respect of it to the workmen themselves; and it was shown in evidence, at the inquest, that every precaution had been taken by the officials of the colliery, to have the working places carefully propped, and to provide timber to be set where necessary, during the absence of the deputy, and also that the hewers were frequently warned to use the necessary precautions.

Accident No. 60 occurred in the Maudlin seam at Usworth Colliery, and was occasioned by the deceased, Hugh McCann, going into a place other than that in which he had been, at the commencement of his shift, set to work, for the purpose of getting a few coals to complete his day's work, and where he thought he would obtain them more readily than in his own working place; but unfortunately by removing the coal the roof fell and killed him.

Suffocation by Gases.

One fatal accident has occurred in my district during the past year from this cause, and it happened on the 3d August, at the Lintz Colliery near Burnopfield, to a hewer named James O'Neil. On notice being received of the occurrence, and at the request of some of the workmen, I examined the state of the mine and the ventilation, previous to the adjourned inquest. The ventilation being in my opinion not sufficient for the general requirements, and considering it my duty to report the same to the Secretary of State and the owners of the colliery, I wrote as follows:—

"Sir, Newcastle-on-Tyne, 15th August 1868.

"I have the honour to report that on the 5th instant I made an inspection of "the workings of the Lintz Colliery, near Burnopfield, my attention having been par- "ticularly directed to that colliery in consequence of a collier having died in a part "of the workings, on the 3d instant, his death being supposed to have been caused by "the imperfect ventilation of the mine, and from a wish expressed in a letter received "from some of the workmen that I should inspect the workings. The result of my "examination of the state of the ventilation, &c., is, that I have considered it my "duty to give the owners of the colliery a notice, of which the following is a copy.

"I have the honour to remain, Sir,
"Your most obedient servant,
"To the Right Hon. Gathorne Hardy, M.P., (Signed) Geo. Wm. Southern.
"Secretary of State,
"Whitehall.

"To the Owners of Lintz Colliery, near Burnopfield.

"Gentlemen, Newcastle-on-Tyne, August 15, 1868.

"I regret to have to give you notice, that on my inspection of the workings of "your mines, on the 5th instant, and to which my attention was more particularly "directed in consequence of the death of one of your workmen, named James O'Neil, "and which, according to the verdict of the jury at the adjourned inquest, on the "7th instant, was said to be from his inhaling, in your mine, noxious gases, I found "the ventilation in some parts scarcely sufficient to comply with the 1st general rule of "the Mine Inspection Act, 23 & 24 Vict. c. 151, and in the cross-cut way of the Busty "Bank seam, not sufficient.

"And I trust, for the safety of your workmen, some means will be immediately "used; in the first place to increase the quantity of air in the mine; and secondly, to "keep a current of air to the face of the workings, where the miners are at work, so "that the 1st general rule, before named, may be fully complied with.

"I have the honour to remain, Gentlemen,
"Your obedient servant,
"Geo. Wm. Southern,
"Inspector of Mines."

I found on a subsequent visit to the colliery that an improvement had taken place, and I have reason to believe that still further improvement is in progress, for its better ventilation.

In Shafts.

Accident No. 3 in the general list occurred at Usworth Colliery, to Andrew Johnson, a hewer, who was killed by being crushed between the cage and guides in the shaft, the cage having been set in motion by the brakesman whilst the deceased was getting in. The evidence given showed the signal arrangements to be as perfect as they could be made, but a misunderstanding had evidently occurred, through the on-setter, William Oliver, having supposed that the movement of the cage was under his control, and, in consequence, allowing the men to get into it; whereas the banksman expected that he was at liberty to signal the brakesman to draw it away, at the time, without a signal from the on-setter. The blame, if any, appeared to be on the part of the on-setter, but at the inquest the jury did not think culpable negligence had been displayed, and returned a verdict of "accidental death."

Accident No. 28 was occasioned, at Seghill Colliery, by a bolt from one of the cages, whilst at the top of the pit, having become disengaged, and falling to the bottom, when it unfortunately caught the assistant on-setter on the head, and caused his death. The engineer of the colliery suggested a different arrangement of such bolts, which would prevent the recurrence of a similar accident.

Accident No. 41 happened at the Eden Pit, Consett Collieries. The waiter-on at the top of an underground staple, whilst performing his duties, was in the act of putting a tub into the cage, as he expected; but the cage, instead of being at the top of the staple, as he supposed, was at the bottom; and the consequence was that he fell with the tub into the shaft or staple, and was killed. A candle was the only light kept at this place, and, not much work being done there, it was supposed to be sufficient for the purpose; but at the inquest the jury recommended that in future an oil lamp or other improved light should be used. I also suggested that a gate, to be worked by the cage, should be erected: both of which the viewer of the colliery said should be attended to.

Accident No. 52 occurred at Beamish Colliery, from the breaking of one of the pit ropes, whilst a horsekeeper was descending the shaft. Although no satisfactory evidence could be obtained at the inquest, it appeared evident that by some unaccountable means, almost immediately the cage was started, the rope had dropped off the pulley, and falling on the shaft of the same, there broke, precipitating the cage with its occupant to the bottom of the pit.

The rope, which was manufactured by Messrs. Newall and Co., of Gateshead, had been in use about three months, and appeared to be of very good quality.

After the accident, for the purpose of testing it, Mr. Spencer, Messrs. Newall's agent, had a portion of it cut from the broken end, and tried in a testing machine at Messrs. Abbot's works, at Gateshead, where it then bore, from my own observation, six times the working load to which it had been put, and about ten times as much as that it was subjected to at the time of the occurrence.

Neither at the inquest, nor on my inspection of the place and inquiries made, could anything satisfactory be ascertained as to the cause of the rope having been thrown off the pulley (supposing such to have been the case), and that it had been so there seemed to have been little or no doubt.

Accident No. 64 occurred at Walbottle Colliery, to a poor boy who had that day been employed to drive a pony from a flat on the inbye side to the top of a staple where the coals are let down from the main coal seam to the splint seam, a depth of about 14½ fathoms. He did not require, in the performance of his duties, to come on the flat sheets, which are of iron, and placed at the top of the staple; and from the evidence at the inquest it appeared that he had been particulary warned that morning by the rolley-way man, under whose charge he was, not to come so near the staple top as the flat sheets; and what caused the rolley-way man to be more particular in charging him was, that he saw that the deceased had clogs on his feet, which, being shod with iron, made him more liable to slip on the metal plates should he inadvertently come on them. Had gates been in use at this staple, doubtless the accident would not have occurred, or at any rate would not have been fatal; and, as in a case referred to in this report, I advised the immediate adoption of the same, which the officials of the colliery promised should be done.

I would here remark that it is very important to have self-acting gates at the top of all underground staples, and I take every opportunity of urging the necessity of their being used.

Miscellaneous Underground.

Accident No. 53 occurred at Mickley Colliery, to a boy named Robert Gair, a trapper at that colliery. He, poor boy, had left the door, of which he had charge, and followed an empty set of tubs drawn by a horse, and which had just passed through his

door, to a flat on the inbye side (a very common practice, although contrary to rules, but the temptation to do so is great in order to relieve the monotony of their employment of opening and shutting the door, and being quite apart from other boys), and after spending a little time there, set off to reach his door before the arrival of a set of full tubs which were about to start; immediately on his starting, a hewer, named Joshua Rutter, in coming outbye was passing the set, and leaping on the first tub, persisted in having the whip from the driver in charge, with which he flogged the horse into an unusually quick pace; the poor boy running in front had it is presumed through this lost his light which he carried, and his progress being retarded in consequence (if he could have escaped even with his light in), was run down by the horse, and then was crushed by the tubs.

The evidence went to show that Rutter had opportunity of knowing and probably did know that the boy Gair was going before the set, but was regardless of consequences.

It was also adduced that the special rules provided that no one was allowed to ride on the tubs, but in practice they had not been prevented; yet there was a special order that no one on any account was to ride on the first tub of the set, this being for the purpose of preventing interference with the duties of the driver.

At the inquest the verdict of the jury was one of "manslaughter" against Joshua Rutter, (and in my opinion a very proper one,) on which he was committed by the coroner for trial at the assizes.

The other fatal cases of a miscellaneous nature underground were in some instances caused by carelessness on the part of the deceased themselves, and in others were of a purely accidental nature.

Miscellaneous on Surface.

The fatal accidents under this head have been, with only one exception, cases of being run over by wagons, and all of the ordinary sort.

Boilers Bursting.

From this cause, I am happy to say, there has been no fatal accident during the past year.

Non-fatal Accidents.

There have been during the year 57 non-fatal accidents reported. Of these there occurred,—

From explosion of gas	11
„ fall of stone	15
„ fall of coal	2
„ tubs	10
„ explosion of powder	5
„ shafts	2
„ miscellaneous underground	6
„ „ on surface	6
	57

The number of non-fatal accidents from explosions of gas which have occurred, point to the urgent necessity of introducing safety lamps in place of naked lights, where there is the least apprehension of danger from explosive gas, and of keeping the brattices (where required to be used) in the working places as near the face as practicable; and those from falls of stone and coal to the need of extreme care on the part of both officials and workmen, to see that every provision is made to secure the roof, by having a sufficiency of timber, and of using it where necessary.

Slips or partings in the roof cause very many accidents; they often exist in roofs otherwise good, and too much caution cannot be exercised as to the propping of a place whenever they make their appearance.

I have, &c.
(Signed) GEO. WM. SOUTHERN,
Inspector of Mines.

To the Right Hon. H. Austin Bruce, M.P.,
Her Majesty's Principal Secretary of State,
Whitehall, London.

LIST of the FATAL COLLIERY ACCIDENTS, and LOSS of LIFE arising therefrom, in the NORTHUMBERLAND and NORTH DURHAM and CUMBERLAND DISTRICT, during the Year ending 31st December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost in Coal Mines.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.														
Jan. 2	1	Melgramfitz	Near Workington	I. Fletcher & Co.	Thomas Halliday	Hewer	33	Getting out of cage whilst in motion	–	–	1	–	–	1
„ 6	2	Togstone	Near Acklington	Isa Smith	Thomas Thompson	Sinker	18	Fell down shaft	–	–	1	–	–	1
„ 13	3	Usworth	Near Gateshead	Geo. Elliot & Co.	Andrew Johnson	Hewer	37	Crushed between cage and slide	–	–	1	–	–	1
Feb. 1	4	Ditto	Ditto	Ditto	John Tyson	Engineman	21	Fell down shaft	–	–	1	–	–	1
„ 14	5	Tanfield Lea	Ditto	Jas. Joicey & Co.	George Brown	Putter	14	Crushed between tub and plank	–	–	–	1	–	1
„ 16	6	Pelaw Main	Near Chester-le-Street.	Hunt, Perkins, & Co.	Henry Bulmer	Hewer	22	Fall of stone	–	1	–	–	–	1
„ 23	7	Burradon	Near Newcastle	J. Bower & Co.	Joseph Duxfield	Banksman	54	Fell off cradle in shaft	–	–	1	–	–	1
Mar. 23	8	St. Hilda	Nr. South Shields	Wood, Blackett, & Co.	John Oliver	Pony putter	15	Crushed by tubs	–	–	–	1	–	1
April 4	9	Blacksyke	Near Milton, Carlisle.	M. Thompson & Sons	George Todd	Hewer	36	Fall of stone	–	1	–	–	–	1
„ 7	10	West Pelton	Near Chester-le-Street.	Jas. Joicey & Co.	John Harrison	Driver	14	Crushed by tubs	–	–	–	1	–	1
„ 13	11	Backworth	Near Newcastle	Lamb, Taylor, & Co.	John Craig	Guard	22	Run over by wagons	–	–	–	–	1	1
„ 20	12	Harrington	Near Harrington	Bain, Blair, and Paterson	David Birnie	Hewer	35	Fall of stone	–	1	–	–	–	1
„ 16	13	Marley Hill	Near Gateshead	J. Bowes and Parts.	Ezekiel Vosper	Ditto	54	Fall of coal	–	1	–	–	–	1
„ 20	14	Asby	Near Arlecdon, Cumberland.	Asby Coal Company	Isaac Ashburn	Overman	44	Explosion of gas	1	–	–	–	–	1
„ 27	15	West Cramlington	Near Newcastle	Backworth and West Cramlington Coal Company.	John Wilkinson	Hewer	57	Fall of coal	–	1	–	–	–	1
„ 29	16	Dipton new winning.	Near Gateshead	R. Dickinson & Co.	H. Fairless	Sinker	28	Stone falling down shaft	–	–	1	–	–	1
May 12	17	Cambois	Near Blyth	Straker, Cookson, & Co.	James Barlow	Wailer	10	Run over by wagons	–	–	–	–	1	1
„ 15	18	Eden Pit, Consett.	Near Medomsley	Consett Iron Company	P. Straughton	Hewer	33	Fall of stone	–	1	–	–	–	1
„ 25	19	North Seaton	Near Blyth	Straker, Cookson, & Co.	John Ord	Ditto	38	Explosion of gas	1	–	–	–	–	1
„ 27	20	Clifton	Near Workington	I. and W. Fletcher & Co.	Thos. Pattinson	Ditto	22	Fall of stone	–	1	–	–	–	1
„ 29	21	Cowpen	Near Blyth	Straker, Cookson, & Co.	Daniel Quin	Driver	14	Crushed by tub	–	–	–	1	–	1
June 11	22	Harton	Nr. South Shields	Wood, Blackett, & Co.	John Wardle	Incline boy	12	Crushed by tubs from rope breaking	–	–	–	1	–	1
„ 12	23	Cramlington	Near Newcastle	Lamb, Potter, & Co.	Elisha Whitehouse	Hewer	22	Fall of stone	–	1	–	–	–	1
								Carried forward	2	8	6	5	2	23

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost in Coal Mines. Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.								Brought forward -	2	8	6	5	2	23
June 17	24	Harraton -	Near Chester-le-Street.	Earl of Durham - -	Robert Ranson -	Rolley-way man.	46	Fall of stone - - - -	–	1	–	–	–	1
					John Bessford -	Stoneman -	33	Ditto - - - - -	–	1	–	–	–	1
„ 18	25	Broughton Moor	Near Maryport -	John Harris - -	John Smith -	Screener -	72	Run over by wagons - - -	–	–	–	–	1	1
„ 19	26	Bedlington -	Near Blyth -	Bedlington Coal Company	Geo. Jackson -	Incline boy	16	Fall of stone - - -	–	1	–	–	–	1
					Joseph Cook -	Driver -	14	Ditto - - - - -	–	1	–	–	–	1
„ 20	27	New Delaval -	Ditto - -	Straker, Cookson, & Co. -	Robt. Smith -	Banksman -	25	Crushed by cage - - -	–	–	1	–	–	1
„ „	28	Seghill - -	Near Newcastle.	J. Laycock & Co. -	Thos. Thompson -	Onsetter's Assistant.	15	Iron bolt falling down shaft -	–	–	1	–	–	1
July 1	29	Plashetts -	Near Falstone -	Laws, Tone, & Co. -	Robert Cunningham	Driver -	12	Run over by tub - - -	–	–	–	1	–	1
„ 16	30	Mickley -	Near Stocksfield	Mickley Coal Co. -	Wm. McLachlan -	Pony driver	14	Run over by set of tubs - -	–	–	–	1	–	1
„ „	31	Usworth -	Near Gateshead	Geo. Elliot & Co. -	D. Adamson -	Hewer -	26	Fall of stone - - -	–	1	–	–	–	1
„ „	32	Cramlington -	Near Newcastle	Lamb, Potter, & Co. -	Wm. Robinson -	Deputy -	30	Ditto - - -	–	1	–	–	–	1
Aug. 1	33	South Benwell -	Ditto - -	Wm. Cochrane Carr -	Geo. Williamson -	Hewer -	44	Ditto - - -	–	1	–	–	–	1
„ 2	34	Ouston - -	Near Gateshead	Hunt, Perkins, & Co. -	John Carr -	Deputy -	47	Explosion of gas - -	1	–	–	–	–	1
„ 3	35	Lintz - -	Ditto - -	Gooch & Co. - -	James O'Neill -	Hewer -	18	By stythe - - - -	–	–	–	1	–	1
„ 8	36	Cleator Moor -	Near Whitehaven	Cleator Iron Co. - -	John McGuiness -	Ditto -	40	Fall of coal - - -	–	1	–	–	–	1
„ „	37	Usworth -	Near Gateshead	G. Elliot & Co. - -	John Goldboro' -	Putter -	18	Tub going amain on engine-plane -	–	–	–	1	–	1
„ 14	38	Cowpen -	Near Blyth -	Straker, Cookson, & Co. -	Wm. Johnson -	Hewer -	26	Fall of stone - - -	–	1	–	–	–	1
„ 15	39	St. Helens -	Near Maryport -	Mulcaster & Co. - -	Jas. Robinson -	Driver -	14	Ditto - - -	–	1	–	–	–	1
„ 17	40	North Seaton -	Near Blyth -	Straker, Cookson, & Co. -	Jon. Maddison -	Hewer -	43	Ditto - - -	–	1	–	–	–	1
„ 18	41	Eden Pitt, Consett	Near Medomsley	Consett Iron Co. - -	Thomas Tighe -	Waiter-on -	55	Fell down staple - - -	–	–	1	–	–	1
„ 21	42	Beamish - -	Near Chester-le-Street.	Jas. Joicey & Co. -	Robert Davison -	Undergrnd. bank-rider.	18	Run over by tubs - -	–	–	–	1	–	1
„ 24	43	Harrington -	Near Harrington	Bain, Blair, & Paterson -	John Pye - -	Hewer -	35	Fall of stone - - -	–	1	–	–	–	1
„ 28	44	Dearham -	Near Maryport -	J. & T. Walker - -	Jas. Lancaster -	Banksman -	26	Crushed by cage - -	–	–	1	–	–	1
Sept. 15	45	Brayton Domain	Near Aspatria -	Trustees of J. Harris -	Thos. Barnes -	Hewer -	19	Fall of stone - -	–	1	–	–	–	1
„ 18	46	Backworth -	Near Newcastle	Lamb, Taylor, & Co. -	John T. Gibson -	Fireman -	22	Run over by wagons - -	–	–	–	–	1	1
„ 21	47	Cramlington -	Ditto - -	Lamb, Potter, & Co. -	Jas. Urwin -	Furnaceman	55	Crushed by cage - -	–	–	1	–	–	1
„ 23	48	Crosby - -	Near Maryport -	Mulcaster & Co. - -	Thomas Dixon -	Shifter -	49	Crushed by tub - - -	–	–	–	1	–	1
„ 24	49	Usworth -	Near Gateshead	G. Elliot & Co. - -	P. Docherty -	Screener -	60	Crushed by wagons - -	–	–	–	–	1	1
								Carried forward -	3	21	11	11	5	51

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accident.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No of Lives lost in Coal Mines.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.								Brought forward -	3	21	11	11	5	51
Sept. 24	50	Washington -	Near Gateshead	Bell, Kimpster & Co. -	Jas. Sadler -	Putter -	16	Crushed by cage - - -	–	–	1	–	–	1
Oct. 8	51	Gilcruix -	Near Maryport -	Gilcruix Coal Co. -	Thos. Ritson -	Hewer -	45	Fall of stone - - -	–	1	–	–	–	1
„ 10	52	Beamish -	Near Gateshead	Jas. Joicey & Co. -	Geo. Atkinson -	Horsekeeper	48	Breaking of pit rope - -	–	–	1	–	–	1
„ 13	53	Mickley -	Near Newcastle	Mickley Coal Co. -	Robert Gair -	Trapper -	12	Run down by set of tubs - -	–	–	–	1	–	1
„ 17	54	Cramlington -	Ditto - -	Lamb, Potter, & Co. -	Wm. Hy. Masters	Hewer -	20	Fall of stone - - -	–	1	–	–	–	1
„ 29	55	West Stanley -	Near Gateshead	D. Burn - -	Chas. Mitchell -	Pony-putter	13	Crushed between tub and roof -	–	–	–	1	–	1
„ „	56	Felling - -	Ditto - -	Geo. Elliot & Co. -	John McTear -	Hewer -	39	Fall of stone - - -	–	1	–	–	–	1
„ 30	57	Beamish -	Ditto - -	Jas. Joicey & Co. -	Thos. Tiplady -	Wailer -	12	Fell off tramway in coal shed -	–	–	–	–	1	1
Nov. 3	58	Whitehaven -	Near Whitehaven	Earl of Lonsdale -	Peter Gibson, junr.	Driver -	14	Crushed by a rolley - -	–	–	–	1	–	1
„ 4	59	Camerton -	Near Maryport -	Camerton Coal Co. -	Jos. Irving -	Hewer -	22	Fall of stone - - -	–	1	–	–	–	1
„ 19	60	Usworth -	Near Gateshead	Geo. Elliot & Co. -	Hugh McCann -	Ditto -	55	Ditto - - - -	–	1	–	–	–	1
„ 20	61	Monkwearmouth	Near Monkwear-mouth.	Bell, Stobart, & Co. -	Owen McGahan -	Ditto -	28	Ditto - - -	–	1	–	–	–	1
„ 21	62	Choppington -	Near Bedlington	Jobling & Co. - -	Arch. Hunter -	Ditto -	21	Ditto - - -	–	1	–	–	–	1
„ 23	63	St. Helens -	Near Maryport -	Mulcaster & Co. - -	Michael O'Hare -	Labourer -	20	Fell from cage - - -	–	–	1	–	–	1
Dec. 17	64	Walbottle -	Near Blaydon -	Lamb & Co. - -	Wm. Wheeler -	Driver -	14	Fell down staple - -	–	–	1	–	–	1
„ 22	65	Etal - -	Near Berwick -	Johnson & Carr - -	Henry Mason -	On-setter -	18	Piece of coal falling down shaft -	–	–	1	–	–	1
„ 24	66	Crosby - -	Near Maryport	Mulcaster & Co. - -	Jon. Donald -	Hewer -	45	Fall of top coal - - -	–	1	–	–	–	1
„ 28	67	Radcliffe -	Near Acklington	Jos. Harrison & Co. -	Anthony Purvis -	Ditto -	36	Fall of coal and stone - -	–	1	–	–	–	1
								Total - -	3	30	16	14	6	69

Mr. Wardell's Report.

Report on the Inspection of Mines in the Yorkshire District, for the Year ended 31st December 1868.—By Frank N. Wardell, Esq.

Sir, Pontefract, 27th February, 1869.

As Inspector of Mines for Yorkshire, I have the honour to transmit for your information my report for the year 1868.

I have much satisfaction in being able to report a diminution in the number of accidents by 7, as compared with the year 1867, resulting in a reduction of 11 in the number of deaths. There is at the same time an increase in the number of collieries, those opened out during the past year being in excess of those worked out, or from other reasons closed. Several are still in process of "winning."

That the total quantity of coal raised is less than that of the preceding year by nearly 150,000 tons, is, I believe, owing chiefly to the general depression of trade. The total produce of coal in the kingdom during 1868, is 104,600,000 tons, and the number of lives lost, 1,011, or one life lost per 103,461 tons.

In this district the total produce is 9,705,000 tons, and the number of lives lost, 80; or one life lost per 121,312 tons. This comparison is most favourable to Yorkshire.

Summary of Separate Colliery Accidents in the Yorkshire District, during the Year ended 31st December 1868.

Explosions of fire-damp	5
Falls of roof	35
In shafts	11
Miscellaneous, underground	13
On the surface	13
Total	77

Summary of Lives lost in the above Accidents.

Explosions of fire-damp	6
Fall of roof	36
In shafts	11
Miscellaneous, underground	13
On the surface	14
Total	80

Shaft Accidents.

Whilst ascending and descending	2
Falling into shaft from surface	4
Falling from part way down	2
Things falling from part way down	2
Cage lowered upon him while repairing signal-wire at bottom of shaft	1
Total	11

MISCELLANEOUS—UNDERGROUND.

Explosion of gunpowder	2
On inclined planes	2
By trams and tubs	8
Filling dirt out of an old shaft, when a portion fell and buried him	1
Total	13

ON THE SURFACE.

By machinery	2
Boilers bursting	1
Chimney blown down	2
Struck by a post while repairing a gangway	1
Run over by waggons and carts	5
Fell off a waggon	1
Struck by arms of a capstan	1
While riding in a tub on an incline struck his head against a bridge	1
Total	14

LIST of COLLIERIES where FATAL ACCIDENTS have taken place during the year 1868.

Owner's Name.	Name of Colliery.	Deaths.
Earl Fitzwilliam	Park Gate	2
Aldwarke Main Co.	Aldwarke Main	1
T. M. Carter and Co.	Allerton Bywater	2
Farnley Iron Co.	Osmondthorpe Walsh	3
Newton, Chambers, and Co.	Thorncliffe	1
Cliffe Coal and Fire Clay Co.	Hollingthorpe	1
Lundhill Coal Co.	Lundhill	1
Jeffcock and Dunn	Carbrook	1
Messrs. Charlesworth	Warren Vale Rothwell Haigh Cosens Milnthorpe Thrybergh Hall Robin Hood	6
Isaac Wood and Son	Dean Lane	1
Sturges and Co.	New Gawber Hall	1
Rotherham, Masbro', and Holmes Co.	Holmes	3
Thrybergh Hall Co.	Thrybergh Hall	1
B. Huntsman	Soaphouse	1
Hird, Dawson, and Hardy	Upper George Mill Shaw	2
David Wroe and Co.	Heckmondwike Waterloo	2
Sharlston Coal Co.	Sharlston	1
Fence Coal Co.	Fence	1
Greenhough and Co.	Adwalton	1
Charles Winn	Nostell	1
J. and J. Haigh	Morley	1
Pope and Pearson	Silkstone	1
Monk Bretton Co.	Monk Bretton	1
B. Huntsman	Nunnery	2
Wombwell Main Co.	Wombwell Main	2
Edmunds Main Co.	Swaithe Main	1
W. Ingham and Sons	Wortley	1
Hudson and Co.	Victoria Silkstone	2
Silkstone Fall Co.	Silkstone	1
Joshua Bower and Sons	Preston West Allerton	3
Manston Coal Co.	West Yorkshire Manston	2
Kiveton Park Co.	Kiveton	1

List of Collieries where Fatal Accidents have taken place—*continued.*

Owner's Name.	Name of Colliery.	Deaths.
Rhodes and Harvey	Car House	2
Leather and Littlewood	Ellis Laith	1
Skinner and Holford	Waleswood	1
Bowling Iron Co.	Clifton	2
	Tong	
H. Briggs, Son, and Co.	Methley Junction	1
A. Harding and Co.	Beeston Manor	1
J. Jackson	Great Gomersal	1
J. Leather	Waterloo Main	1
W. Ackroyd, Bros.	Morley Main	1
G. and J. Haigh	Ravensthorpe	2
	Alverthorpe	
Wharncliffe Silkstone Co.	Wharncliffe Silkstone	1
West Yorkshire Co.	West Ardsley	1
E. Sutcliffe and Co.	Victoria	1
J. Baistow	Norwood Green	1
Blacker Main Co.	Blacker Main	2
Burnley's Executors	St. John's	1
Samuel Fox and Co.	Stocksbridge	1
Woolley Coal Co.	Woolley	1
Inspectors of Hoyland and Elsecar	Hoyland and Elsecar	1
Howley Park Co.	Howley Park	1
Locke and Co.	Kippax	1
Staveley Coal and Iron Co.	North Staveley	1
Garforth Coal Co.	Garforth	1
Asquith, Bros.	Howden Clough	1
William Day	Old Mill	1
	Total Deaths	80

MONTHLY STATEMENT of DEATHS caused by ACCIDENTS in the COAL MINES of the YORKSHIRE DISTRICT during 1868.

	Explosions.	Falls of coal and roof.	In shafts.	Miscellaneous.	Above ground.	Total.
January	—	8	3	2	1	14
February	1	3	4	1	3	12
March	—	2	—	1	1	4
April	—	5	1	2	1	9
May	—	3	2	1	1	7
June	1	3	—	—	1	5
July	—	2	—	1	—	3
August	—	2	—	1	1	4
September	—	—	—	—	1	1
October	—	4	—	3	2	9
November	1	1	1	1	1	5
December	3	3	—	—	1	7
Total	6	36	11	13	14	80

I have much pleasure in stating that this district was, in 1868, free from any of those very serious calamities, involving the deaths of many persons, which from time to time have occurred. Each fatal accident, with the exception of three, resulted in the death of one person only, and in each of the three exceptions the number killed was two.

There have been five fatal accidents from explosion of fire-damp, causing thereby the deaths of six persons.

Accident No. 17 *in the Tabular List.*

This is the first of the above-named, and occurred at Messrs. David Wroe and Sons' pit at Heckmondwike near Dewsbury, when two boys were burnt by an explosion of fire-damp whilst "hurrying" on the waggon-way about fifty yards from the bottom of the shaft. One of the boys, named Taylor, died from the injuries so received.

On an examination of the pit, I cannot say that I found the management good; and

the pernicious system of mingling safety-lamps with naked lights was here (as it is at too many other collieries) in full force.

Gas occasionally showed itself in the workings, and, according to the evidence, at the inquest, of a collier named Redmayne, the men were in the habit of using lamps in the morning, sometimes changing them for candles towards the middle of the day, and this with the knowledge and under the direction of the steward.

On the morning of the explosion a terrific gale was blowing, and as the pit is only 36 yards deep, this may have had something to do with the disarrangement of the ventilation. The explosion took place, in all probability, at the furnace, flashing back through some old workings round to where the boys were "hurrying." These old workings were in close proximity to the furnace, and separated from it only by very inadequate "stoppings." One of the witnesses, Kitchenman, said that he had sometimes seen the gas "fire" at the top side of the furnace, before the accident occurred. Part of the workings of this pit were ventilated by the return air from another pit belonging to the same company, so that, instead of the men in this "Heckmondwike" pit having fresh air to breathe, they had vitiated air which had already done its duty in another pit. A verdict was returned by the jury of "accidental death," but they appended to it a censure on the proprietors for the deficient state of the ventilation in the mine. I requested Messrs. Wroe & Sons to have the old workings at the furnace effectually separated from it by proper and sufficient "stoppings" and to make a drift for the return air, at the same time advising the adoption of locked safety-lamps entirely throughout the pit, and the alteration of the ventilation so as to let the men in the "Heckmondwike" pit have fresh air.

Accident No. 47 *in the Tabular List.*

The deceased, Wm. Thompson, was a "hurrier," working for a man called Booth, alias Normanton. They were employed at the "Ravensthorpe" pit, near Dewsbury, belonging to Messrs. G. & J. Haigh. The place where the explosion of fire-damp occurred was an old "bank" which had been finished some two or three months. On the morning of the accident, Anderson, the bottom-steward, had visited every working place, and found all safe, with the exception of one place where there was a small quantity of gas. This place he temporarily stopped, and put up the usual signals, viz., crossed rails, and a board marked "Fire," according to the rules. It might be perhaps 200 yards from where the explosion took place. The "bank" which was finished, he had visited the day before, the special rules not requiring a daily inspection of the "places not working," but that they shall be examined "at least on every alternate day." He had then found it safe, and free from gas, with a proper current of air circulating through the air course. About eight or nine yards from this air-course, Normanton was working. After Anderson's examination of the old "bank," and previous to his inspection next morning of Normanton's working place, he (Normanton) had deliberately stowed away the "refuse" from his working place into the air-course, thereby building it completely up, and of course causing a stoppage there of the air. The reason for his so doing is only too obvious, to save himself trouble, as otherwise he would have had to remove the "refuse" a greater distance. One of the special rules distinctly states that, under penalty of fine or other punishment, no person shall "obstruct an air-course." On the morning of the explosion, requiring some rails, and thinking that there were some up this old "bank," he sent his "hurrier," Thompson, to procure them, the boy having a naked light. The consequence of this, owing to the stoppage of ventilation by the air-course being built up, and the accumulation of gas thereby, was that an explosion took place at his naked light, so seriously injuring him that he died shortly afterwards. Normanton had been told that morning by the steward where to obtain rails, should he require them, but as it was some eighty yards distant, to save time, he, in direct violation of rules, did as I have described. I considered that the bottom-steward, Anderson, was deserving of severe censure, in as much as he had examined Normanton's place on the morning of the explosion, and had actually passed within a yard of where the air-course was built up, without discovering it! It is the duty of a man holding the responsible position of underground manager to examine carefully all that comes under his notice while fulfilling his important duties. The coroner, very justly, severely remarked on this extreme carelessness. A verdict of manslaughter was returned against Normanton, who was committed to the Leeds assizes and properly punished.

Accident No. 70 *in the Tabular List.*

This accident also occurred in a pit belonging to Messrs. G. & J. Haigh, at Alverthorpe, near Wakefield. Upon examination, I found the system of ventilation not so

good as it might have been, and other details connected with the general working of the mine capable of much improvement. On the north side of the pit each man had the fresh air; but on the south side, simply owing to deficient arrangements, some of the men had the return air. There was no reason why the south side could not have been similarly ventilated to the north; and on suggesting this and other improvements to the owners, they very properly agreed that the alterations should be made.

The deceased, David Ramsden, was a collier, and was working in a "bank" contiguous to a four-feet "throw," or dislocation of the strata. The place had been examined on the morning of the explosion by the deputy before Ramsden commenced working, who found it safe; and again, about two hours before the explosion, the underground steward was there, and observed no gas. Ramsden was helping the "hurrier" out with a "corf," and put his candle against one of the props, when the gas immediately fired, and both the man and boy were severely burnt, the man so much so, that he died soon afterwards. When the steward, David Lumb, visited the place before the explosion, there was a slight fall, but when he returned afterwards a heavy fall had taken place. Whether this fall took place, and thereby liberated a quantity of gas, or whether the fall was occasioned by the concussion of the explosion, is a matter of conjecture. In my opinion the steward was much to blame in allowing naked lights to be used here. There was no good reason he could bring forward to show the utility or necessity for so doing, and there were many reasons to the contrary. In the first place, the men working on either side had, by Lumb's orders, locked safety-lamps! the "bank" was ventilated by return air, and, in addition, was in close proximity to a throw where gas might reasonably be expected, more or less, to be given off. The place most certainly ought to have been worked with safety-lamps, in which case this explosion and loss of life would not, in all probability, have occurred. I have recommended the proprietors to use locked safety-lamps exclusively, and, at the inquest, the coroner spoke strongly in support of this opinion.

Accident No. 72 in the Tabular List.

Two men were killed by an explosion of fire-damp in the West Allerton Colliery, belonging to Messrs. Joshua Bower and Sons. This pit had, in the month of April, by some means taken fire, and after remaining sealed for four months, was opened out in August last. The greater portion of the workings had been duly explored before the explosion in December, and at the time of that misfortune a distance of only something like 200 yards was unexplored. It was here where the unfortunate men met their deaths. Charles Winn, a deputy, gave instructions to the two deceased, Crossland and Lee, to examine the air-courses. On the morning of the explosion he told them to go to the top south endings of the east bords. This was the unexplored portion; Lee was under Crossland's orders, the latter being considered an experienced practical man; Winn told them to use, and had provided them with Stephenson's lamps, giving them strict orders, as a matter of precaution, to use no other. They had, however, secretly disobeyed this order, obtaining Davy lamps from the cabin, which were found near their dead bodies. Nothing more was heard of them, and as they did not come out of the pit at their regular time, a search was instituted, and their bodies found in the south endings between two doors in the retum air-way; the coal between these doors was sooty; their lamps were also found *locked and in good order*. The men who were working nearest to this place would probably be about 900 yards distant. One of them, Charles Gilsthorpe, stated that when working he felt what may have been the explosion; his candle was put out, but he also had an oil lamp which was not put out; there also seemed to be a slight check of the wind. He however concluded at the time that the cause of this was a fall somewhere in the pit. I am sorry to state that there was no regularly appointed lamp-keeper at this mine, and instead of *one* man having charge of, and being responsible for the lamps, *several* of the byeworkmen and deputies had keys. This laxity of discipline I laid before the owners, and was assured that the matter should be attended to.

Accident No. 74 in the Tabular List.

In the case of this accident, which took place at the Waterloo Colliery, near Dewsbury, belonging to Messrs. David Wroe and Co., I think it can only be attributed to that carelessness or utter recklessness so often unfortunately displayed. The deceased, Edward Sweeny, was a "hurrier," and was engaged at the time of the explosion in "hurrying" at this colliery. The deputy, Scargil, had that morning examined a place which was being "put through" a "throw." He found there a little gas, in consequence of which he got a pair of rails and put them across the place, according to rule, and chalked the word "fire" on them. He also told the boy Sweeny not to go there.

as there was gas. Notwithstanding all this, Sweeny deliberately went past the crossed rails with his naked light, and an explosion immediately followed, burning him so that he died a few days afterwards from his injuries.

I will now proceed to notice any details which strike me as deserving of remark, in the remaining accidents.

Accident No. 5 *in the Tabular List.*

This occurred at Thorncliffe Colliery, near Sheffield, belonging to Messrs. Newton, Chambers, and Co. Two men were clearing some earth and refuse from an old shaft-bottom; they were working with a long poker, six yards away from the bottom of the shaft, strict orders having been given them not to go into the shaft-bottom. Owing to the wet and slushy state of the debris, it came away quicker than they expected, and buried the deceased, George Coope, thereby suffocating him. The other man was knocked down, but otherwise uninjured. It did not appear that any carelessness or negligence on the part of any one was here exhibited.

Accident No. 8 *in the Tabular List.*

The deceased, Booth, was a boy who was employed at the Carbrook Colliery, near Sheffield, belonging to Messrs. Jeffcock and Dunn. He was engaged near the bottom of the shaft, when he was struck on the head by a wheel which fell from a corf ascending in the cage. The banksman stated that he observed the cage catch slightly at a "bunting" or cross beam about three or four yards from the top of the shaft, which appeared to drive the corf to one end of the cage. This may have been the cause of the wheel becoming detached from the axle, in fact it is the only way in which to account for the accident. The underviewer said that the shaft was in good order, and that no complaint had been made to him of any obstruction to the ascent or descent of the cage, which had been working all the morning up to the time of the accident, perfectly smoothly in the shaft.

Accident No. 10 *in the Tabular List.*

The unfortunate man, John Jowitt, was, it appeared, an inmate of the Clapham union, and was subject to fits which produced temporary insanity. Whilst in this state he had strayed from the union, and climbed over the railing at Dean Lane Pit, near Bradford, belonging to Messrs. Isaac Wood and Sons, and deliberately jumped down the shaft, of course meeting with instant death.

Accident No. 13 *in Tabular List.*

This case furnishes an instance of carelessness on the part of the deceased, and of the danger attending any violation of the special rules. Six men were about to ascend the shaft at Thrybergh Hall Colliery, belonging at that time to the Thrybergh Hall Co. (now the property of Messrs. Charlesworth), and got into the cage for that purpose. The signal was given to "go on," when the deceased attempted suddenly to get in, and was immediately caught between the cage and the roof. He was terribly mutilated, and died within a few minutes of the shocking occurrence.

Accident No. 16 *in the Tabular List.*

This accident occurred at the Walsh Pit, near Leeds, belonging the Farnley Iron Co., and resulted in the deaths of two men, J. Cowburn and J. Barraclough. These men were in a cabin near the mouth of the pit, when a chimney was blown down, which falling partly on the cabin, caused their deaths. The chimney was in an elevated and exposed situation, and it is right to mention that the gale raging at the time was one of extraordinary violence. From evidence obtained at the inquest, it appeared that the chimney had been built some eight years previously, and being found too low, was four or five years ago raised about five yards in height. The thickness at the base was three bricks, about half way up two bricks, and the remainder to the top one brick. A verdict of "accidental death" was returned; but it was very wisely and properly supplemented by an opinion that chimneys, in such exposed situations especially, should be built with sufficient thickness at the base to enable the summit to be finished with a thickness of two bricks.

Accident No. 18 *in the Tabular List.*

The deceased, C. Beaumont, in this case, whilst engaged in a shaft at Sharlston Colliery, belonging to the Sharlston Coal Company, assisting to lower the "bed of a stay," incautiously stepped off a plank on which he was standing, and was precipitated down the shaft. No blame appeared to be attached to any one, the accident arising from the poor man's own negligence.

Accident No. 22 *in the Tabular List.*

This accident occurred on the surface, at Messrs. J. and J. Haigh's Colliery, at Morley, near Leeds. The deceased, J. Myers, a carpenter, was engaged with another carpenter in repairing a "gangway" which had been partly blown down by the wind. They had removed some of the earth from the foot of an upright support, when it fell and struck the deceased on the head. The man, McDonald, who was working with him, stated that the post fell very slowly, and that deceased had ample time to have got out of the way, and further, that he, McDonald, shouted to him to do so. The unfortunate man, however, who was directly under the post, appears to have been as it were spell-bound, and quite incapable of moving. He did not seem to be much worse immediately after the accident, but in a short time alarming symptoms supervened, and he rapidly sunk from concussion of the brain.

Accident No. 24 *in the Tabular List.*

The deceased, P. Burns, was employed as a sinker in the "sinking pit" at Monk-Bretton, near Barnsley, belonging to the Monk-Bretton Coal Co. The shaft at the time of the accident was about fifty yards deep. The pumps in the shaft were a "hanging lift." It was customary to put in "chogs" or "stays" between the pumps and the shaft-side to keep the lift "plumb" or vertical, and for the purpose of preventing oscillation. Some "stays" were put in the night before the accident, about twelve feet from the top, at the delivery-pipe flanch. As the sinking proceeds the pumps are gradually lowered. They were lowered about seven inches at 3 o'clock on the morning of the accident. After that, the sinker in charge of the "shift" of men then working, carefully examined the shaft, paying particular attention to the "stays," which he found in proper order. About 4 o'clock a "shot" was fired, and it was shortly after this that the "stays" from some cause fell down the shaft, and struck deceased on the head, killing him on the spot. There is a hole through each "stay" or "chog" through which a rope is passed, and so they are lashed to the pumps. All due precaution appeared to have been taken, the master sinker, Bradley, and the man in charge of the "shift," both examined the shaft and pumps during the night. The concussion caused by the "shot" may in some way have loosened the "stays" by breaking the rope, and produced such melancholy and disastrous effects.

Accident No. 25 *in the Tabular List.*

This accident, like the last, occurred in a "sinking pit." The deceased, George Cotton, with other sinkers, was engaged at his work at the bottom of a shaft at the Nunnery Colliery, near Sheffield, when a piece of stone fell upon his head, causing such injuries as to produce his death within a very few hours. The shaft was then about 150 yards deep. The sides of the shaft had been regularly examined by the men in charge of the "shifts," and by the master-sinker. The shaft was also examined always between the firing of a "shot" and the men returning to the pit bottom. The following is the special rule which applies to this case, and I have every reason to believe it was strictly carried out:—"The master sinker must, during each shift, carefully examine the shaft, "and cause all loose pieces to be removed."

Accident No. 29 *in the Tabular List.*

In this case the deceased, John Parker, met with his death whilst engaged in firing a "shot" in the Dragon Pit at Wortley, near Leeds, belonging to Messrs. Ingham. Upon inquiring into the accident, I found that, without doubt, the unfortunate young man had been using his "pricker" in an improper and very injudicious manner, and, in fact, by doing what he and the rest of the miners had been repeatedly cautioned not to do. He had drilled the hole and was putting the powder in, and *striking his "pricker" with his hammer*, when it undoubtedly struck some hard substance and exploded the shot, killing him on the spot, and injuring his brother who was working with him. The "pricker"

ought merely to be worked round with the *hand* and not *struck*. It presented the appearance after the accident, of a hook, the end having been completely bent by the striking. I recommended the owners to introduce a bye-law rendering the use of a hammer to a "pricker" a punishable offence. This I am glad to say they at once agreed to.

It is also a custom, too much in force, and one which cannot be too strongly condemned, to ram the "stemming" with an iron "rammer." By using a copper or wooden "rammer" and "pricker," I believe many accidents connected with blasting would be avoided.

Accident No. 35 *in the Tabular List.*

George Dickinson, the poor fellow who was killed in this case, seems to have been a man of nervous temperament, and occasionally subject to fits, indeed his death may perhaps be attributed to this nervousness. In my opinion, no man so constituted ought to be employed in or about shafts, where he is more peculiarly exposed to danger; and this unhappy instance fully bears me out in my conviction. Samuel Hambrough and the deceased were engaged in the shaft of the West Yorkshire Pit, Manston Colliery, belonging to the Manston Coal Co. They were upon a stage or scaffold some thirty yards from the bottom, wedging the tubbing. The tubbing was made tight in the October previous, it is $1\frac{1}{2}$ inches thick, and the pressure is about 100 lbs. to the square inch. Whilst busy upon the stage, which was an ordinary semi-circular one, some of the tubbing was blown out. Dickinson, frightened and startled at this, stepped back, and fell off the scaffold down the pit, his death resulting in a few hours.

Nothing struck him, so that he was not in any way knocked back, but seemed to be so startled that he momentarily forgot where he was.

Accident No. 41 *in the Tabular List.*

This accident occurred at the bottom of the shaft at Waleswood Colliery, near Sheffield, the property of Messrs. Skinner and Holford. The deceased, Wm. Outram, was employed as a banksman at this colliery, and on the day of the accident he, in company with his brother, went into the shaft to repair the conducting rods. The two men previously to this had been examining the shaft from top to bottom, being let down slowly, first in one cage and then the other, for that purpose. Up to this time all went well, and it was during the repairing of the conducting rods, which was consequent on this examination, that the accident took place, the cage being lowered upon the men while they were standing in the bottom of the shaft. It appeared to me that this was done through a misapprehension of signals. The same engine-man was working the engine the whole time the examination and repairs were in progress, and he bore a very good character as a steady intelligent man who knew his business. Repeated signalling had been going on for some time whilst the rods were being repaired, the cage being moved up or down as the men required to be at a higher or lower elevation; and when it was lowered, and unfortunately killed Outram, it seems to have been rather from a misunderstanding than from any inattention or negligence. During the whole of the time there was a man stationed at the pit mouth, in accordance with the special rules.

Accident No. 43 *in the Tabular List.*

This, as well as the next four alluded to, was an accident on the surface; it however differs from the others in that it was a case in which the deceased, E. Rhodes, was killed through his own wilful and perverse recklessness. He, in company with some other young men, was proceeding along the road near to one of Messrs. Harding's disused shafts, at Beeston Manor near Leeds, on a Sunday evening, when his attention was caught by a bird's nest in the pulleys over the shaft. He immediately said he would "have it," and, though cautioned and repeatedly warned by his companions not to venture, persevered, and jumped upon the fencing round the shaft. He paid the penalty of his rashness, and fell to the bottom of the shaft, a depth of 27 yards, death being the immediate result.

Accident No. 44 *in the Tabular List.*

Hopkinson, the deceased, was employed in carting coals from Mr. Jackson's Colliery at Great Gomersal, near Leeds. When coming away from the pit, having filled his

cart, one of the wheels caught against some timber which was lying on the ground, and in some way knocked him down and ran over him, his death transpiring almost immediately. According to the evidence of his father, who saw the accident, the boy would seem to have taken too sharp a turn with his cart, as the timber was quite out of the way of all traffic, there being a space of about twenty-seven feet between it and the pit-bank wall.

Accident No. 57 *in the Tabular List.*

This was an accident which took place at the Nunnery Colliery, near Sheffield, belonging to B. Huntsman, Esq. The deceased, R. Burns, was a labourer, and, together with some twelve or fourteen others, was engaged at the time of the accident in lowering some temporary "head-gear" over the pit top by means of a capstan. The power of fourteen men at the capstan was more than sufficient to lower this weight, but unfortunately as the "gearing" approached the ground, many of the men appear to have let go their hold, the consequence being that the weight overpowered the rest, causing the arms of the capstan to revolve very quickly and strike Burns on the head. There is no doubt that most of the men were thoughtlessly walking round, and not endeavouring to hold back the load and so let it down gradually. The consequence of their inattention to their work was the death of one of their fellow workmen.

Accident No. 62 *in the Tabular List.*

The accident arose during the unloading of a waggon of timber which was standing in a siding at the Howley Park Colliery, near Batley, the property of the Howley Park Coal Co. It occurred in so simple a manner as scarcely to deserve comment, and without dereliction of duty on the part of any one. The deceased, T. Allighan, was standing on the top of a waggon of timber, unloading it, when he by a false step overbalanced himself, falling over into the road and dislocating his shoulder. Expectations were at first entertained of his recovery, which however were not fated to be realized, as he died shortly afterwards.

Accident No. 67 *in the Tabular List.*

There is a tramway connecting the staiths with Kippax Colliery, on which this accident occurred. The colliery is the property of Messrs. Locke and Co., and is situated near Normanton. The deceased, Joseph Hewitt, was riding up to the pit in one of the tubs on this incline,—the men having permission so to do,—when he lost his stick into the tub next that in which he was seated, and during his attempt to regain it his head came in contact with a bridge, thereby dislocating his neck. The tramway at this bridge passes under the highway. There was no violation of any rule, and the accident can only be attributable to the poor man's forgetfulness of the danger, he having constantly travelled in the same way before. My opinion was that *if* men were allowed to travel in this manner, they should only do so at stated times, and then under the charge of one steady and careful man who would be responsible for their taking proper precautions to avoid similar accidents.

Falls of and roo

The number of accidents from falls of coal and stone is very large indeed. Out of the total number of 80 deaths in this district during 1868, there were 36 from this cause alone, or 45 per cent.

Too much attention cannot be paid to this subject, and it is one which I take every opportunity of impressing upon managers and stewards. The special rules in this district with regard to the use of timber are very stringent, and very justly so. It is therefore the duty of each in his station to do his utmost to see every rule carried out in its integrity. There is no rule more neglected, and none which in its violation produces so great a loss of life, as that which orders the miners to set short "props" or "sprags" at least every two yards, in "holing" or "baring" the coal. Much depends upon the miners themselves. In many cases an accident is the result of their wilful disobedience of this rule; and the utter disregard to safety which is too frequently displayed would indeed be incredible to all but those who are practically aware of the stern and veritable fact. Of course many of these falls occur when even all apparent care is taken, from "slips" in the roof, "partings," and other similar causes: the roof in such cases which has fallen and buried the unfortunate miner, will, an instant before, sound perfectly solid and safe.

It is the duty of all concerned in a mine to take every known and approved means for preventing accident; and so far as regards accidents from falls, where so much depends

ls of coal
l roof.

upon a regular and judicious use of timber, it is the duty, first, of the owners and agents to have at all times a sufficient supply of the same within reach; secondly, of the stewards and deputies to see, so far as they possibly can, every time they visit a man in his working-place, that he is carrying out the rules by a proper use of this timber; and thirdly, it is incumbent on the men themselves to take all due precaution for their own lives, and use every available means of safety which lies within their power.

There can be no greater mistake than to imagine that either a scant and insufficient supply of timber on the one hand is a pecuniary gain, or, on the other hand, that an obstinate refusal to use it when there is a saving of time. It is an established fact, though proved perhaps by a lamentable experience, that *true* economy consists in *safety*.

ıce-gates
op of
fts.

The use of properly constructed fence-gates at the top of shafts is becoming, I am happy to say, more general. I invariably advocate their adoption, as there is no doubt that they constitute a great safeguard, and are the means of preventing many accidents from persons falling down shafts.

nplaints.

The complaints I have received during the year have not been numerous. I have investigated them, and when they were based upon substantial grounds, succeeded in getting my suggestions and recommendations fairly carried out.

ı-fatal
losion at
ley Park.

In December an accident occurred in the Emley Park Colliery, near Wakefield, which, though serious, was providentially not fatal.

The cause of the accident was an explosion of fire-damp, which seriously burnt two men and two boys. They went to their working-places in the morning with naked lights. These places, it turned out, *had not been previously examined with a safety-lamp*. One of the special rules expressly states, that the "underground viewer or his "deputy shall, (with a *safety-lamp*) *daily* examine every travelling-road and working-"place, *before the miners and boys descend*... ... ... and if danger from "gas or from any other source be apprehended, he shall not allow a miner or boy to go "there until the danger is removed." The manager and his deputy did not bring forward any satisfactory reason for evading this rule, and did not even deny having done so. I found also, on examination, that the air-currents were not (in accordance with the special rules) measured regularly with an anemometer, that the furnace was not kept constantly in operation day and night, and that the fires were smothered with fuel; also that there was no indicator in the engine-house, nor was the fly-wheel securely fenced. Signals were improperly given by the hanger-on, and the engine-man was not at the pit in proper time to let down the viewer and his deputy.

For all these violations of the general and special rules, I, after receiving your instructions to prosecute, summoned the owner, manager, hanger-on and engine-man before the magistrates, and they pleading guilty were fined for each offence. I merely asked for nominal penalties, for the sake of example, there being every desire on the part of the owner to see that for the future every rule should be strictly enforced. I would advert here to the fact that managers like the one in this instance are too frequently to be met with, at small collieries where there is no very great output, and a comparatively small staff of officials. They are respectable men in their proper position, but quite out of place as managers of mines; and so long as such owners will not employ a better class of men as their managers, and offer sufficient inducement to obtain the services of experienced and skilled men, they must not be surprised if such accidents as these accrue. The magistrates, very properly, were most severe in their censure of the owner, and the general arrangements at the colliery. It is a matter of great thankfulness that the injuries to the unfortunate persons did not terminate fatally. The owner has promised, for the future, strict attention to the general and special rules.

I have, &c.
(Signed) Frank N. Wardell,
Inspector of Mines.

To the Right Hon. H. A. Bruce, M.P.,
Her Majesty's Principal Secretary of State,
Whitehall.

List of the Fatal Colliery Accidents, and Loss of Life arising therefrom in the Yorkshire District, during the Year ending 31st December 1868.

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost in Coal Mines. Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.														
Jan. 3	1	Park Gate	Rotherham	Earl Fitzwilliam	Thos. Brailsford	Collier	30	Fall of coal	–	1	–	–	–	1
„ 4	2	Aldwarke Main	Ditto	Aldwarke Main Co.	John Bough	Ditto	35	Ditto	–	1	–	–	–	1
„ 5	3	Allerton Bye-water.	Castleford	T. M. Carter & Co.	Sam. Coates	Ditto	35	Fall of roof	–	1	–	–	–	1
„ 6	4	Osmondthorpe	Leeds	Farnley Iron Co.	A. Rouse	Ditto	35	Ditto	–	1	–	–	–	1
„ 9	5	Thorncliffe	Sheffield	Newton, Chambers, & Co.	Geo. Coope	Ditto	—	Filling dirt out of an old pit, when a portion fell and buried him.	–	–	–	1	–	1
„ 10	6	Hollingthorpe	Wakefield	Cliffe Coal & Fire Clay Co.	W. Atkinson	Trammer	15	Crushed by tubs at the bottom of an incline, through a chain breaking.	–	–	–	1	–	1
„ 13	7	Lundhill	Barnsley	Lundhill Coal Co.	W. Smith	Collier	38	Fall of coal	–	1	–	–	–	1
„ „	8	Carbrook	Sheffield	Jeffcock and Dunn	— Booth	Trammer	13	Axle and wheels from an ascending tub fell down the shaft upon him.	–	–	1	–	–	1
„ 14	9	Warren Vale	Rotherham	Messrs. Charlesworth	A. Maughan	Ditto	28	Fall of coal	–	1	–	–	–	1
„ 19	10	Dean Lane	Bradford	Isaac Wood and Son	John Jowitt	—	30	Threw himself down the shaft	–	–	1	–	–	1
„ 22	11	New Gawler Hall.	Barnsley	Sturges and Co.	J. Capham	Collier	17	Fall of roof	–	1	–	–	–	1
„ 25	12	Holmes	Rotherham	Rotherham, Masbro', and Holmes Co.	Elijah Briggs	Ditto	30	Ditto	–	1	–	–	–	1
„ 27	13	Thrybergh Hall	Ditto	Thrybergh Hall Co.	F. McMann	Labourer	40	Caught by ascending cage, he having got in after the signal was given.	–	–	1	–	–	1
„ 28	14	Soaphouse	Sheffield	—	H. Cheetham	—	—	Boiler tube collapsed	–	–	–	–	1	1
								Total for January	–	8	3	2	1	14
Feb. 1	15	Upper George	Bradford	Hird, Dawson, and Hardy	G. Woodhead	Collier	35	Fall of roof	–	1	–	–	–	1
„ „	16	Walsh	Leeds	Farnley Iron Co.	J. Cowburn	—	19	Chimney, blown down in a gale, fell upon them whilst sitting in a cabin at the pit.	–	–	–	–	2	2
					J. Barraclough	—	38							
„ 8	17	Heckmondwike	Dewsbury	David Wroe and Co.	J. Taylor	Hurrier	16	Explosion of gas	1	–	–	–	–	1
„ 10	18	Sharlston	Wakefield	Sharlston Coal Co.	C. Beaumont	Labourer	47	Fell down the shaft	–	–	1	–	–	1
„ 12	19	Fence	Rotherham	Fence Coal Co.	F. Pashley	Hanger-on	—	Run over by empty tubs	–	–	–	1	–	1
„ 14	20	Adwalton	Leeds	Greenhough and Co.	Randall Ball	Collier	20	Fall of roof	–	1	–	–	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost in Coal Mines.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.														
Feb. 17	21	Nostell	Wakefield	Charles Winn	H. Hargreaves	Deputy	40	Fall of roof	–	1	–	–	–	1
„ „	22	Morley	Leeds	J. and J. Haigh	J. Myers	Carpenter	30	Whilst repairing a gangway, was hit by a falling post.	–	–	–	–	1	1
„ 25	23	Silkstone	Ditto	Pope and Pearson	Ed. Minor	Mechanic	21	Scaffold gave way at bottom of shaft	–	–	1	–	–	1
„ 27	24	Monk Bretton	Barnsley	Monk Bretton Co.	P. Burns	Sinker	60	Hit by a piece of wood which fell down the shaft.	–	–	1	–	–	1
„ 27	25	Nunnery	Sheffield	B. Huntsman	W. Cotton	Ditto	31	Hit by a stone which fell from shaft-side	–	–	1	–	–	1
								Total for February	1	3	4	1	3	12
Mar. 9	26	Wombwell Main	Barnsley	Wombwell Main Co.	W. Hirons	Hurrier	37	Fall of roof	–	1	–	–	–	1
„ „	27	Rothwell Haigh	Leeds	Messrs. Charlesworth	John Ward	Driver	17	Run over by a tip-wagon	–	–	–	–	1	1
„ 24	28	Swaithe Main	Barnsley	Edmunds Main Co.	J. Bramwell	Byeworkman	25	Fall of coal when taking out puncheons	–	1	–	–	–	1
„ 25	29	Wortley	Leeds	W. Ingham and Sons	John Parker	Collier	19	When stemming a shot, he struck his spindle against some ironstone, and the shot exploded.	–	–	–	1	–	1
								Total for March	–	2	–	1	1	4
Apr. 5	30	Wombwell Main	Barnsley	Wombwell Main Co.	Luke Maw	Nipper	13	Run over by tubs in a Jenny bank	–	–	–	1	–	1
„ 8	31	Victoria	Wakefield	R. Hudson and Co.	J. Bastow	Collier	49	Fall of roof	–	1	–	–	–	1
„ 11	32	Silkstone Fall	Barnsley	Silkstone Fall Co.	Geo. Walton	Hurrier	17	Ditto	–	1	–	–	–	1
„ 16	33	Preston	Leeds	J. Bower and Sons	Geo. Atack	Driver	18	Run over by tubs	–	–	–	1	–	1
„ 19	34	Allerton Bye-water.	Castleford	S. M. Carter and Co.	Amos. Jackson	Collier	24	Fall of roof	–	1	–	–	–	1
„ 20	35	West Yorkshire	Leeds	Manston Coal Co.	Geo. Dickinson	Sinker	47	Sheeting blown out of tubbing in which he was wedging, on a scaffold in the shaft, and so alarmed him that he stepped backwards off the scaffold and fell down the shaft.	–	–	1	–	–	1

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	No. of Lives lost in Coal Mines. Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868. April 26	36	Kiveton Park -	Sheffield -	Kiveton Park Co. -	John Lakin -	Labourer	54	When putting a rope on the engine drum the adjusting screw on the brake broke, and the brake straps fell upon him.	–	–	–	–	1	1
„ 27	37	Car House -	Rotherham -	Rhodes and Harvey -	W. Dawes -	Collier -	26	Fall of roof - - - -	–	2	–	–	–	2
					W. Goodlad -	Ditto -	37							
								Total for April - -	–	5	1	2	1	9
May 1	38	Ellis Laith -	Wakefield -	Leather and Littlewood -	Simon Jaggar -	—	—	Fall of roof - - - -	–	1	–	–	–	1
„ 2	39	Clifton -	Bradford -	Bowling Iron Co. -	John Brook -	Collier -	42	Ditto - - - -	–	1	–	–	–	1
„ 6	40	MethleyJunction	Normanton -	H. Briggs, Son, and Co. -	A. Kidd -	Hurrier -	16	Run over by a tub - - -	–	–	–	1	–	1
„ 7	41	Waleswood -	Sheffield -	Skinner and Holford -	W. Outram -	Banksman	37	Repairing the signal wire at the shaft bottom, when the cage was lowered upon him.	–	–	1	–	–	1
„ 8	42	Silkstone -	Wakefield -	Hudson and Co. - -	Thomas Colley -	Night-chargeman.	—	Fall of roof - - - -	–	1	–	–	–	1
„ 17	43	Beeston Manor	Leeds - -	A. Harding and Co. -	Ed. Rhodes -	Collier -	19	Fell down a disused shaft when bird-nesting.	–	–	1	–	–	1
„ 18	44	Great Gomersal	Ditto - -	J. Jackson - -	J. Hopkinson -	Labourer	13	Run over by a cart when loading coals from the pit.	–	–	–	–	1	1
								Total for May - -	–	3	2	1	1	7

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.														
June 4	45	Waterloo Main	Leeds	J. Leather	John Dobson	Collier	21	Fall of roof	–	1	–	–	–	1
,, ,,	46	Morley Main	Ditto	W. Ackroyd, Brothers	Jas. Holt	Hurrier	23	Ditto	–	1	–	–	–	1
,, 7	47	Ravensthorpe	Dewsbury	G. and J. Haigh	W. Thompson	Ditto	15	Explosion of gas in an old bank	1	–	–	–	–	1
,, 13	48	Wharncliffe Silkstone.	Barnsley	Wharncliffe Silkstone Co.	C. Hutchinson	Coal-washer.	60	Struck by a wheel	–	–	–	–	1	1
,, 25	49	West Ardsley	Leeds	West Yorkshire Iron and Coal Co.	W. Blakey	–	29	Fall of roof	–	1	–	–	–	1
								Total for June	1	3	–	–	1	5
July 10	50	Victoria	Barnsley	E. Sutcliffe and Co.	Geo. Mosby	Hurrier	12	Fall of coal	–	1	–	–	–	1
,, ,,	51	Norwood Green	Halifax	J. Baistow	John Ward	Deputy	58	Fall of roof	–	1	–	–	–	1
,, 13	52	Blacker Main	Barnsley	Blacker Main Co.	Fred. Seckor	Driver	15	Crushed between tubs and some props	–	–	–	1	–	1
								Total for July	–	2	–	1	–	3
Aug. 1	53	Holmes	Rotherham	Rotherham, Masbro', and Holmes Co.	Thos. Vernon	Driver	20	Crushed by wagons	–	–	–	–	1	1
,, 3	54	Park Gate	Ditto	Earl Fitzwilliam	E. Hoyle	Collier	57	Fall of coal	–	1	–	–	–	1
,, 6	55	St. John's	Wakefield	Burnley's Executors	H. Thackray	Ditto	25	Ditto	–	1	–	–	–	1
,, 22	56	Stocksbridge	Sheffield	S. Fox and Co.	W. Bailey	Hurrier	13	Wagon which brings the tubs from bottom of incline to surface broke, and part of it went back down the incline striking the boy	–	–	–	1	–	1
								Total for August	–	2	–	1	1	4

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.														
Sept. 26	57	Nunnery	Sheffield	B. Huntsman	R. Burns	Labourer	28	While working at the crab with others lowering pulley legs, the arms of the crab revolved rapidly, striking him.	–	–	–	–	1	1
								Total for September	–	–	–	–	1	1
Oct. 2	58	Cosens	Leeds	Messrs. Charlesworth	F. Hutchinson	Hurrier	14	Crushed by a tub	–	–	–	1	–	1
„ 7	59	Woolley	Barnsley	Woolley Coal Co.	C. Leek	Byework-man.	48	Run over by tubs	–	–	–	1	–	1
„ 10	60	Hoyland and Elsecar.	Ditto	Inspectors of Hoyland and E. Colly.	G. Steeples	Collier	44	Fall of coal	–	1	–	–	–	1
„ 17	61	Mill Shaw	Leeds	Hird, Dawson, and Hardy	J. Robinson	Ditto	23	Fall of roof	–	1	–	–	–	1
„ 20	62	Howley Park	Batley	Howley Park Co.	J. Allighan	Labourer	60	Fell off wagon of timber while unloading it.	–	–	–	–	1	1
„ „	63	Milnthorpe	Wakefield	Messrs. Charlesworth	G. Thomas	Hurrier	12	Run over by wagon on which he was riding.	–	–	–	–	1	1
„ 21	64	Thrybergh Hall	Rotherham	Ditto	J. Harvey	Byework-man.	35	Crushed by a tub which ran amain down a jenny.	–	–	–	1	–	1
„ 24	65	Robin Hood	Wakefield	Ditto	W. Ramsden	Hurrier	17	Fall of roof	–	1	–	–	–	1
„ 29	66	Manston	Leeds	Manston Coal Co.	W. Hill	Collier	23	Ditto	–	1	–	–	–	1
								Total for October	–	4	–	3	2	9
Nov. 5	67	Kippax	Normanton	Locke and Co.	Jos. Hewitt	Staithman	66	While riding in a tub on an incline his head came against a bridge underneath which the tubs ran.	–	–	–	–	1	1
„ 6	68	North Staveley	Rotherham	Staveley Coal and Iron Co.	Geo. Hill	–	—	Explosion of his shot	–	–	–	1	–	1
„ 19	69	Tong	Leeds	Bowling Iron Co.	John Hartley	Hurrier	14	Fell out of cage when descending the shaft. This is a gin-pit.	–	–	1	–	–	1
„ 23	70	Alverthorpe	Wakefield	G. and J. Haigh	D. Ramsden	Collier	25	Explosion of gas	1	–	–	–	–	1
„ 26	71	Garforth	Leeds	Garforth Coal Co.	T. Barber	Byework-man.	50	Fall of roof	–	1	–	–	–	1
								Total for November	1	1	1	1	1	5

List of Fatal Colliery Accidents—*continued.*

Date.	No. of Accidents.	Name of Colliery.	Where situate.	Owner's or Agent's Name.	Persons killed.	Occupation.	Age.	Cause of Death, and Remarks.	Number of Lives lost.					
									Explosions.	Falls of Coal and Roof.	In Shafts.	Miscellaneous.	Above Ground.	Total.
1868.														
Dec. 10	72	West Allerton	Leeds - -	J. Bower and Sons -	W. Crossland -	Collier -	37	Explosion of fire-damp - - -	2	–	–	–	–	2
					R. Lee -	Ditto -	27							
„ 12	73	Holmes - -	Rotherham -	Rotherham, Masbro', and Holmes Co.	J. Wolsterholme	Hurrier -	17	Fall of roof - - - -	–	1	–	–	–	1
„ 17	74	Waterloo -	Dewsbury -	David Wroe and Co. -	E. Sweeny -	Ditto -	12	Explosion of fire-damp - -	1	–	–	–	–	1
„ 19	75	Howden Clough	Leeds - -	Asquith, Bros., and Co. -	J. Byewater -	Coal sorter	11	Run over by a wagon - - -	–	–	–	–	1	1
„ 20	76	Old Mill -	Barnsley -	Wm. Day - -	C. Hodgson -	Collier -	31	Fall of coal - - - -	–	1	–	–	–	1
„ 30	77	Blacker Main -	Ditto - -	Blacker Main Co. -	F. Padget -	Ditto -	34	Ditto - - - - -	–	1	–	–	–	1
								Total for December -	3	3	–	–	1	7
								Total for the Year -	6	36	11	13	14	80

MINES.

REPORTS

OF

THE INSPECTORS OF MINES,

TO

HER MAJESTY'S SECRETARY OF STATE,

For the Year 1868.

MR. ATKINSON.
MR. DICKINSON.
MR. HIGSON.
MR. EVANS.
MR. WYNNE.
MR. BROUGH.
MR. BAKER.
MR. WALES.
MR. MOORE.
MR. ALEXANDER.
MR. SOUTHERN.
MR. WARDELL.

Presented to both Houses of Parliament by Command of Her Majesty.

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PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1869.

REPORT

ON THE

REPORT
PALL MALL

PRINTWORKS ACT

AND ON THE

BLEACHING AND DYEING WORKS ACTS.

WITH APPENDIX.

Presented to both Houses of Parliament by Command of Her Majesty.

44

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REFORM CLUB
PALL MALL

REPORT ON THE PRINTWORKS ACT AND ON THE BLEACHING AND DYEING WORKS ACTS.

TO THE RIGHT HONOURABLE HENRY AUSTIN BRUCE, M.P., HER MAJESTY'S PRINCIPAL SECRETARY OF STATE FOR THE HOME DEPARTMENT.

Commission on the Employment of Children, Young Persons, and Women in Agriculture (1867),
(Late Children's Employment Commission (1862)),
2, Victoria Street, Westminster, May 24, 1869.

SIR,

1. On the 9th July 1867 the Select Committee of the House of Commons, to which the Factory Acts Extension Bill and the Workshops Regulation Bill were referred, recorded their opinion in a special report that Printworks and Bleaching and Dyeing Works should not be included in those Bills, inasmuch as no investigation into the operation of the Acts regulating such works had taken place, those trades not having come within the terms of the Children's Employment Commission; but they recommended that a Commission should issue for the purpose of inquiring into and reporting upon the operation of the Printworks Act and the Bleaching and Dyeing Works Acts.

2. We were requested by Mr. Secretary Hardy to name to him a proper person to make the inquiry. We had the honour to propose to him Mr. John Edward White, M.A., Fellow of New College, Oxford, Barrister-at-Law, one of the Assistant Commissioners under our late Commission, whose ability was conspicuously shown in the course of his duties under that Commission.

3. The services of Mr. White were accepted, but as he was at that time on the continent, it was not until the 13th November 1867 that we received instructions from Mr. Secretary Hardy to put Mr. White in possession of such information as had come before us in the course of the inquiries under the late Commission relative to the alleged defects in those Acts, to issue instructions to him for the conduct of his inquiry, and to request him to report to us his proceedings, with a view to our forwarding to the Secretary of State such remarks upon the evidence Mr. White might collect, and upon his report, as they might suggest, with a view to future legislation.

4. Mr. White's instructions from the Secretary of State were to inquire into "the "Printworks Act and the Bleaching and Dyeing Works Acts for the purpose of ascer- "taining whether any and what modifications are required in those Acts, and to what "extent their provisions might be assimilated to those of the Factory Acts."

5. Towards the end of November 1867 Mr. White entered upon his duties under full instructions from us for his information and guidance in relation to the points and localities of his inquiry. He completed the inquiry early in the following summer of 1868.

6. While engaged in writing his report, and with every probability that it would be ready before the end of the then session of Parliament, Mr. White unfortunately fell into a state of health which for several months incapacitated him from effective exertion. The consequence has been that it was only on the 6th instant that we received Mr. White's report and evidence finally corrected. We have now the honour to forward it, together with such remarks as they seem to us to suggest.

PRINTWORKS.

7. The term "printworks" means works in which patterns or colours are imprinted on fibrous fabrics or yarns (A. 29); and the calico printworks so far exceed all others in number and importance that they may be taken "as in most points sufficiently repre- "senting the other branches of printing," more especially as they present "the greatest "peculiarities of feature." (A. 43.)

8. It appears from Mr. White's report (ss. 4–6) that both employers and workpeople engaged in printworks have had under their consideration the question of alterations in the present Act, the difference between them being as to the extent of the alterations.

9. By the present Printworks Act children and females are liable to be employed between the hours of 6 a.m. and 10 p.m., and males of 13 years of age and upwards may be employed for 24 hours consecutively, and there is no Saturday half-holiday. The provision for education, long since acknowledged to be of very little value, is confined to requiring attendance at school for 150 hours every six months.

10. The inconvenience of the wide difference between the law as affecting the hours of work in printing, and in bleaching and dyeing works, and in both, as compared with the Factory Acts, has caused much dissatisfaction among many employers, and produced a desire for alterations to some extent in the Act, while among the operative printers the general opinion in England seems to be in favour of extending to printworks the entire provisions of the Factory Acts (A. 6).

11. The vast amount of capital engaged in the printing trade, the number of persons employed, and the quantity and value of the productions, demand that the legislative regulations regarding them should be approached with much caution.

12. Of printed cloth the estimate is that in 1852 it consumed about one-seventh in weight of all the cotton imported, and that the annual production had increased by 50 per cent. in the year 1866. Of the entire export of manufactured cotton goods, exclusive of yarns, in 1852, "about one-fourth in value, or nearly 6,000,000*l*., was from the print "trade, and formed in quantity rather more than three-fourths of the entire production "of printed goods in this country." The number of persons coming under the Printworks Act is estimated at 30,000 (A. 14–16).

13. Although, as above adverted to, the general inclination of opinion among the operatives is in favour of the assimilation of the Printworks Act with the Factory Acts, the importance of the interests concerned requires that the opposite views should receive the fullest attention.

14. Mr. White has entered with great minuteness and particularity into every branch of the subject, and has, as it appears to us, fully and fairly stated all the points for consideration as representing the views both of the masters and the men. He has also described all the peculiarities of the manufacture, and the special circumstances affecting each branch as a trade, which require to be taken into account with reference to legislation, together with the provision for education under the present Act, and its very imperfect and unsatisfactory results.

15. On all these points Mr. White's statements are so complete, and at the same time necessarily so full of detail, that any attempt to present them in an abridged form would do them injustice, and also fail to convey sufficient information for any practical purpose.

16. We confine ourselves therefore to saying that having carefully considered the facts and statements brought together by Mr. White, we are of opinion that the conclusions to which they have led him, as given in ss. 258–264 of his report, are correct, and may safely be adopted as a basis for legislation.

17. These conclusions may be embodied in the following propositions :—

1. Considerable alterations in the Printworks Act are required and practicable.
2. There is no sufficient reason why the printworks should not be placed under the general provisions of the Factory Acts subject to certain modifications.
3. The nature of some of the processes in printworks, and the exigencies of the trade, require that the following modifications should be made in any Act which places them under the Factory Acts.

    A.—Male young persons of the age of 16 years should be allowed to be employed as adults.

    B.—In the dyeing department of every printwork the provisions of s. 8 of the Bleaching and Dyeing Works Act (23 & 24 Vict. c. 78., 1860) should be adopted in regard to meal times, namely, male persons above 13 years of age should be allowed to have their meals at different times of the day, and to be employed during the meal time of the children, young persons, and women, who should be permitted to be employed during the meal times of such male persons.

    C.—Where in any printwork the process in which any child, young person, or woman is employed is in an incomplete state at the hour at which such child, young person, or woman is required by the Act to cease work, such child, young person, or woman should be allowed, in conformity with the permission given in similar cases by s. 18 of the Schedule of the Factory Acts Extension Act (1867), to be employed for a period not exceeding 30 minutes beyond the said hour.

D.—The Secretary of State should be empowered to give permission, (as by s. 25 (*e.*) of the Schedule of the Factory Acts Extension Act, 1867,) that a surgical certificate given by a certifying surgeon shall not be invalid solely on account of the employment of the child or young person named in such certificate in a factory other than that for which the certificate was originally granted, if such factory is within the district of the same certifying surgeon.

E.—That s. 31 of the Factory Act (7 Vict. c. 15.), which permits children to attend school on alternate days on condition that they are employed for 10 hours only on the working days, should be repealed in regard to printworks, and that children who are employed in such works for 10½ hours on three alternate days should be required to attend school for five hours between eight in the morning and six in the evening on each week-day preceding each day's employment, except on Saturdays.

F.—The provisions of the new Act should be made to take effect by degrees after the manner of the temporary modifications of the Factory Acts Extension Act, viz.:—

(*a.*) For the first six months after the passing of the Act males of not less than 13 years of age, for the first 18 months males of not less than 14 years of age, and for the first 30 months males of not less than 15 years of age, should be allowed to be employed in such manner and for such times as had previously been permitted in printworks.

(*b.*) The regulations of the Factory Acts in regard to meal times should not come in force until the expiration of 18 months after the passing of the Act.

Bleaching and Dyeing Works.

18. Of the present Bleaching and Dyeing Works Act, passed in 1860, Mr. White is able to say that "notwithstanding what are considered by some to be great defects," it is "generally admitted" that its effect has been "decidedly good." "It has conferred "great benefits, moral and physical, on an important class of workpeople, as is gratefully "acknowledged by them, without injury to the general trade. Though in the case of "some individual establishments, the production is said to have been diminished by the "restrictions of the Acts, this does not appear to have been the case taking the trade as "a whole" (A. 265–79, 280).

19. The three causes which appear principally to have brought about this satisfactory result are, "greater attention to the mode of conducting the work, so as to meet the "altered cicumstances," "improvements of different kinds in machinery and appliances," and "a far more general appreciation of the value of time" (A. 281).

20. And reviewing the circumstances and opinions bearing upon the important point of whether "there has been sufficient experience of the working of the Act to admit of a "fair judgment being formed, at least as regards the points which are complained of as "imperfect," Mr. White's conclusion is that there has been (A. 284).

21. The provisions of the Bleaching and Dyeing Works Act approach much nearer to the Factory Acts than those of the Printworks Act. A very large and influential body of opinion throughout the trade, taken as a whole, both in England and Scotland, is in favour of a more complete application of the general principles of the Factory Acts to bleaching and dyeing works. Of this opinion are the operative bleachers and dyers generally in England, whose object is "to have the factory hours" (A. 298, 303, 307). In Scotland, also, the great majority wish for the strict factory hours (A. 311). Of the employers in England, although the general feeling is that of being "well satisfied with "the law as it stands," an important minority appear to be, if not actively in favour, at least not decidedly hostile to the assimilation of the Bleaching and Dyeing Works Acts to the Factory Acts (A. 304–309); while in Scotland the masters are "much less "opposed to a change to the strict factory limits, and some decidedly in favour of it." (A. 311.)

22. The chief, indeed Mr. White rightly says, "the only great point at issue as regards "works under the Bleaching and Dyeing Works Act," is the power of employing females and young persons in making up time "lost in consequence of fluctuations in "trade, the nature of the process, or any other cause." They may be so employed until half-past four o'clock on Saturday, and until eight o'clock at night on other days.

23. This power is open to several serious objections. It is very vague, and is consequently variously interpreted in different districts and works. It "imposes no condition "as to the manner in which the time is lost. If an employer closed his works or

" suspended the employment of the females and young persons or any of them on " Saturday, he could employ those whose employment had been so suspended till eight " o'clock every night but Saturday in the following week, and if this was continued " throughout the year it would be hard to show that he was not within the letter of " the law. It might possibly in some cases be convenient to avoid the short day on " Saturday, and make the other days longer, as is spoken of as done sometimes in the " case of a printwork referred to" (A. 301).

24. It gives employers "the opportunity of calling any time lost a suspension of employ- " ment within the meaning of the Act," and when the power is exercised largely, as in many cases, " the practical effect is to make the law substantially very different from the " Factory Acts, and as the cotton factories and bleach works are naturally in the same " neighbourhoods, the contrast is brought forcibly home to the workpeople" (A. 286).

25. The "lost time register" is so framed as not to show how much, or whether any time has been lost. There is no record to enable the workpeople to know whether or how much time has been lost, as a guide to them in ascertaining whether they are rightly required to work over hours to recover it; and at times young persons and women are employed, in recovering time alleged to have been lost, for many weeks, and might legally be employed for several months together (A. 288–290).

26. There are clear indications that the opinion of many employers has undergone a change since the Act of 1860 was passed, in reference to the importance of this power to make up time lost from any cause. Some of the principal bleaching and dyeing and finishing firms, both in England and Scotland, have made no use of the power, and never employ young persons and women beyond the usual hours (A. 305, 306, 308, 309, 310, 312, 313); and among these firms are several bleachers and dyers and finishers of fine and fancy goods and other kinds, in which department of the trade there is a greater liability to fluctuations arising from seasons and fashions than in the case of the more plain and useful goods (A. 305–318).

27. But certain special circumstances, both in the processes and in the trade itself, require to be recognized in determining upon the legislation suitable to the case. These are in the main similar to those of the printworks, in which also the processes of bleaching and dyeing are ordinarily carried on as part of the same establishment. In independent bleaching and dyeing works there is the same occasional necessity for continuing unfinished processes after the usual hours of work, and there is the same liability to unforeseen demands to execute work at short notice. In those respects, therefore, the modifications of the strict letter of the Factory Acts which are applicable to the one, are applicable to the other.

28. There is also a peculiarity in regard to the machinery employed in bleaching and dyeing works, which may reasonably be taken into account in legislation. By the Factory Acts no permission is given to make up time lost by breakages of machinery. In factories under those Acts the machinery is light and not liable to serious derangement; and the derangement of one part does not necessarily involve the stoppage of any great number of persons. But in bleaching and dyeing works the machinery is heavy and more liable to derangement, and a stoppage in one department involves delay in all the subsequent processes. Although it would appear that since the hours of work were shortened and made more regular by the Act of 1860, " break-downs of machinery " have much diminished in consequence of " the greater opportunities afforded of attending to " it, and keeping it in order" (A. 321), yet such accidents will occur, and it is desirable to give the opportunity of recovering time lost by the breakage of machinery, under the same strict regulations as to registering the time lost as those of s. 31 of the Factory Act.

29. Another special case is that of the Turkey red dyeworks. These were exempted from the Act of 1860, and are still free from regulation. Their case is fully stated by Mr. White (A. 331–350). It remains the same as at the time of the inquiry into bleaching and dyeing works in 1855. The peculiarity of the processes is that each process occupies a day, and that therefore the hours of work on Saturday must be the same as on any other day; and both the chemical and open air processes require relaxations respecting meal times, and the power of working for a short period beyond the usual hours of work to complete unfinished processes or to meet emergencies incident to the work. The usual hours in Turkey red dyeworks are from six to six, with two hours for meals (A. 345). But Mr. White shows that in this branch of manufacture long hours for children, young persons, and women are possible, and have in fact occurred (A. 350).

30. It will probably therefore be considered inexpedient that this should be the only trade or manufacture in the country exempt from legislation, which it would be if its present exclusion from the Act of 1860 were continued.

31. The suggestions which we beg to offer for the amendment of the Bleaching and Dyeing Works Acts, and in regard to Turkey red dyeworks, are the following, and are substantially in accordance with the conclusions arrived at by Mr. White (A. 352):—

1. Bleaching and dyeing works should be placed under the general provisions of the Factory Acts subject to the following modifications:—

A.—Male young persons of 16 years should be allowed to be employed as adults.

B.—So much of s. 8 of the present Bleaching and Dyeing Works Act as relates to the meal times of males above 13 years of age in dyeing works should be re-enacted in the manner specified above in regard to printworks (s. B.) (A. 324).

C.—Ss. C., D., and E. of the modifications specified above in regard to printworks should be applied also to bleaching and dyeing works.

D.—Power should be given to recover time lost from breakages of machinery, under the same regulations as those of the 7 & 8 Vict. c. 15. s. 33. (A. 297).

E.—Inasmuch as emergencies, arising from the state of the weather or the nature of the processes, often require that young persons and women should be employed in Turkey red dyeworks during hours different from those of the Factory Acts, it should be lawful to employ such persons according to the custom of the trade in each locality in which the trade is carried on; provided always, that their total hours of work do not exceed $10\frac{1}{2}$ in any one day, and 60 in any one week, with not less than the usual intervals for meals.

This regulation should not come in force until the expiration of 18 months after the passing of the Act.

In every case where the hours worked should be different from those of the the factory hours, a record of the actual hours of employment and of the meal times should be kept in a book, to be referred to by the inspector on demand at any time within six months.

32. The extension to bleaching and dyeing works of the modifications of the Factory Acts as proposed for the printworks may be regarded, in reference to the former, as in some degree an equivalent for their present very slightly restricted power of making up lost time. Another substitute for that power was suggested by some persons to Mr. White, but was not considered likely to be generally acceptable (A. 302).

33. The great inconvenience arising from the fact, that the operations of Bleaching and Dyeing, and the operations subsidiary to them, where carried on in connexion with a Printing establishment, are under one Act, and where carried on independently of Printing, are under another (A. 8–10), leads to the conclusion that all the branches of employment coming under the Printworks Act and the Bleaching and Dyeing Works Acts should now be included in one Act, and be subject, as nearly as possible, to the same regulations.

We have the honour to be,
Sir,
Your obedient servants,

HUGH SEYMOUR TREMENHEERE,
EDWARD CARLETON TUFNELL.

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PALL MALL

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REPORT by Mr. JOHN EDWARD WHITE.

To HER MAJESTY'S COMMISSIONERS.

GENTLEMEN,

A.

1. EARLY in November last (1867) I had the honour to receive from Her Majesty's Secretary of State instructions to "inquire into the Printworks Act, and the Bleaching and Dyeing Works Acts, for the purpose of ascertaining whether any and what modifications are required in those Acts, and to what extent their provisions might be assimilated to those of the Factory Acts." I afterwards received instructions to address my report to you. This I have now the honour to do.

Objects of the inquiry.

2. The Acts into which an inquiry was thus directed, though resembling or identical with the Factory Acts in some points,—the Bleaching and Dyeing Works Acts being in fact the Factory Acts with certain modifications,—yet differ from them in other and very material points. Attention has often been drawn to the nature and working of these Acts in the reports of the Factory Inspectors, and in other ways, and alterations of various kinds suggested.

The Acts differ from the Factory Acts.

3. The attention of persons affected by the Acts seems to have been more specially called to the subject in the early part of the year 1867, by the Bills then before Parliament for the extension of the Factory Acts.

Factory Acts Extension Bill 1867.

4. At a meeting of calico printers then held at Manchester, the centre of the calico print trade in England, it was resolved that it was desirable to obtain an amendment of the Printworks Act, and a committee of masters were appointed to consider the details of the proposed change, and to take steps for obtaining an amended Act. The nature and extent of the amendment so proposed will be more conveniently shown hereafter; it is sufficient to state here that the limitations proposed would be much narrower than those of the present Printworks Act, and much wider than those of the Factory Acts, in some respects about half-way between the two, though much further as regards children.

Amendment of present law proposed by masters in print trade;

5. Great efforts also, as appears, on the part of the workpeople have been made to obtain a removal of the main points of difference between the Acts regulating their respective employments and the Factory Acts, in the principal seat of these two classes of trade in England. Bills for carrying out this object had been prepared by organized bodies of the workpeople some time previously to my inquiry. One of these related to printworks only, the other proposed to include printworks, bleaching, and dyeing works in the same Act.

by workpeople in both trades.

6. An account of the proceedings on behalf of the workpeople, as given by the Ten Hours Bill Committee of the workpeople in printworks, and by the representatives of the operative Bleachers, Finishers, and Dyers Association, will be found in Nos. 42, 182—184. From the former it appears that a number of petitions representing the bulk of the English printworkers were sent up in the previous session of Parliament.

7. In that session, 1867, the question was laid before the Select Committee on the Factory Acts Extension Bill. The Committee made a special report (House of Commons Papers, 429, 9th and 16th July 1867) that they had not complied with the request of the petitioners, who asked that the printworks, bleaching, and dyeing works, should be included in the Factory Acts Extension Bill, inasmuch as no investigation into the operation of the Acts regulating those trades had taken place; but they recommended that an inquiry should be instituted and a report made upon the operation of those Acts. An inquiry was afterwards directed under the instructions above stated, and has been carried out accordingly.

Special Report of Select Committee on Factory Acts Extension Bill 1867.

8. The trades regulated by these Acts, as well as a branch referred to hereafter, which but for a special exemption would come under one of these Acts, and which as appears is still exempt from any legislative regulation whatever, are closely connected with the textile manufactures and with each other. The materials on which they operate are fibrous fabrics and yarn, which they take up in the state in which these goods leave the hands of the manufacturer, and which they bring to the finished condition in which the goods reach the consumer. The resemblance of these trades is such that in several respects the employment furnished is practically the same.

Close connexion of the trades with the textile manufactures and each other.

9. Indeed, owing to their not being treated alike by the law, their close connection leads to some practical inconvenience in the working of the several Acts. It is possible that without any unnatural combination of trades the business of one firm may be, as to one part of the employment under one law, as to another part under a second, as to another part under a third, and as to another part, exempt from any. This no doubt would be an extreme case, but it has been reached by a firm whose business still comes under the Factory Acts, the Printworks Act, and the Bleaching and Dyeing Works Acts, the

Variety in the law as to parts of same establishment.

A. Inconvenience of this.

fourth or exempted branch of their business having been given up (No. 93). Less extreme cases, however, of the different state of the law as regards different parts of the employment in the same establishment or premises, are not so unusual. The business of another firm, all carried on in the same premises, is legally under the Factory Acts, the Printworks Act, and the Bleaching and Dyeing Works Act. I was informed by one of the firm that from circumstances they were not aware of being under the latter (No. 94). The premises of another firm are part under the Printworks Act, part under the Bleaching and Dyeing Works Acts, and part under no Act (No. 147). In other cases, part of the employment is under the Factory Acts and part under the Printworks Act, or part under the Printworks Act and part under the Bleaching and Dyeing Works Acts, or part under the Printworks Act and part under no law. The combination may vary according to circumstances.

10. It is obvious that unless separate parts of the premises and separate workers are confined simply to the employment falling legally under one or other of the heads as to which the law is distinct, which may not always be convenient, and in some cases seems hardly practicable, it must be difficult, unless by keeping entirely within the limits of the more restrictive law, to guard against confusion and to secure the strict observance of the law, even with the full desire to keep within it.

Printwork operations falling under Bleaching, &c., Works Acts.

11. Again, operations incidental to printing, if they are carried on on the same premises as the chief printing process, or on other premises, which though, it may be, as is found in one case, miles distant form part of the same business establishment, are regulated by the Printworks Act. It often happens, however, that from the insufficiency of the establishment or appliances, temporary pressure of work, or some other reason, these operations are not carried on on premises forming part of the same establishment, but are wholly or in part done for the printers by persons who are not printers. Bleachers are spoken of who "only bleach cloth for printers," and in Scotland bleaching and finishing works have found part of their business in finishing for printers. In such cases these very operations, not falling within the definition of the Printworks Act as incidental processes, though employed for the preparation or completion of printed goods, and in no respect differing from the same operations as carried on in printworks, are regulated by the Bleaching and Dyeing Works Acts.

Dissatisfaction caused by this.

12. This has caused great dissatisfaction to the finishers in the Glasgow district (Nos. 218 seq.) They urge in effect that in justice and to enable them to compete on equal terms with the printers, with whom the practice of finishing their goods for themselves instead of putting them out to be finished has increased of late to the considerable loss of the finishers, either the finishers should be allowed the wider limits of the Printworks Act, or the printers should be brought within the narrower limits of the Bleaching and Dyeing Works Acts.

Importance of the trades.

13. As regards both the two classes of Acts which form the subject of inquiry, the question of making any modifications in them is one of great importance, both as to the number of persons and the greatness of the interests concerned. The quantity and value of the productions, the number of the works and the large scale on which many of them are conducted, the number of persons employed in them, the amount and nature of the machinery, and other circumstances alike show this.

14. As long ago as the year 1852 when the production of the print trade was, as there is reason to believe, far less than it is now, it was estimated that the annual production of printed cloth in this country consumed about one-seventh in weight of all the cotton import, and that of the entire export of manufactured cotton goods, exclusive of yarns, amounting to nearly 24,000,000*l.*, about one-fourth in value, or nearly 6,000,000*l.* was from the print trade, and formed in quantity rather more than three-fourths of the entire production of printed goods in this country. These estimates are taken from a lecture read before the Society of Arts by a high authority, Mr. E. Potter, M.P., to whose kindness I am indebted for a reference to it. They appear not to include certain parts of the print trade, which though of a somewhat different nature still come under the operation of the Printworks Act.

15. The official returns of exports show that in the year 1866 the quantity of those classed under the head of manufactured cotton goods (not yarn) as "printed, checked, and dyed," and of which, to judge from the former calculation referred to, half at least or more would be printed goods, was 50 per cent. greater than in 1852, and the value more than double ; the value, however, probably being much affected by the altered price of cotton. In 1867 the value of the export of British printed goods, as estimated with reference to the French Exhibition, amounted, as I am told by one informant, though I have been unable to find further proof of this, to 16,000,000*l.* The value of printed, checked, and dyed cotton manufactured goods (not yarn) for the year 1866, is given in the official returns as upwards of 22,000,000*l.*

16. The number of works, and probably that of the workpeople coming under the Bleaching and Dyeing Works Acts is far larger than of those coming under the Printworks Act. I was able from my own inquiries to form an estimate of the number of persons employed in printworks as probably not far from 30,000 ; but could not form any approximate estimate of the numbers employed in bleaching, dyeing, and finishing works. The census tables in these respects are, from the nature of the case, a very insufficient guide, and it is safer not to attempt to draw even an approximate estimate from them. But they seem to show that the number of persons engaged in occupations falling under these Acts probably amounts at least to many thousands.

Nature and extent of the inquiry made.

17. With regard to the Bleaching and Dyeing Works Acts it soon appeared to me that the points to be considered were few and plain, limited to the nature of the Acts themselves and certain modes of working them, not requiring more than a limited amount of illustration, and not such as to involve much reference to the details of the employment.

18. With regard to the Printworks Act, a fuller and more detailed inquiry and an examination of the details of the employment itself in printworks seemed to be necessary. The Act regulating these works differs from the Factory Acts much more widely than the Bleaching and Dyeing Works Acts do; a much longer time has passed since an inquiry into the employment was made, and more changes have taken place ; the print trade itself also presents more peculiar features with regard to restrictions of hours, material to be considered. The works also are less widely scattered and include much fewer that employ only small numbers, thus admitting of inquiry as to a larger proportion of them than would have been expedient as to works of the other class.

19. As a means of bringing the subject under the notice of employers and of ascertaining their views, and various facts material to the inquiry more widely than would otherwise have been easy to do, a cir-

ular requesting information on these points, with a letter stating the nature of the inquiry, was prepared. A.
or this circular "Form of Inquiries," see Appendix. These circulars were issued to, so far as I
uld learn, all the employers in printworks in the districts pointed out as the chief seats of the trade,
d who include nearly the whole of the calico print trade. They were also issued to a number of
eaching, dyeing, and finishing works, including those pointed out to me as the principal in different
anches so far as chiefly material to the present question, the number so issued to works of this class
ing greater in itself than that issued to printworks, though much less relatively to the whole number
works.

20. I also visited and made personal inquiry at a large number of works of different kinds. These
clude most of the more important and several of the smaller printworks and bleachworks and sufficient
ecimens of works of other kinds regulated by these Acts in the chief seats of these trades.

21. By these means with other help afforded to me, a large amount of information was obtained,
hich is sufficiently represented by what is shown here and in the evidence. In a great number of
ses the replies and statements made were of so uniform a nature that it would be needless to repeat
em. In a trade so varied and intricate as the print trade, there are numberless details which in
ractice more or less affect the regularity of the employment, and many of which were pointed out to
e. Probably without a practical acquaintance with each kind of work it would be impossible to
escribe them all fully, but to attempt more than a general illustration of them, so far from being
eful, would only lead to confusion. It may, I think, fairly be assumed that, as appeared to be the
se, the more important as regards the difficulties caused by them are pointed out by those acquainted
ith them in each case, and that on the whole as regards printworks, as well as bleaching, dyeing, and
ishing works, the facts and requirements of the trades generally are sufficiently represented.

22. I regret indeed that in several cases I was disappointed in not receiving communications which
had reason to expect. This not only involved the loss of a certain amount of time, but must account
r the omission of interesting statements which I should have been glad to give as regards some
portant firms. They could not, however, substantially alter the general results arrived at, though in
e or two cases they would, so far as the opinions entertained were expressed to me, be more favourable
an assimilation of the Acts in question to the Factory Acts than the statements which are given on
e part of employers.

23. My inquiry, after making myself acquainted with some preliminary matters, was begun in the
ncashire district, as the principal seat of the trades affected by the Acts in question in England,
ere my first step was to place myself in communication with the committee of masters in print-
rks, who kindly met me and expressed their views on the subject, and offered me every assistance,
hich I found of great service and have much pleasure in acknowledging.

24. With regard to bleaching, dyeing, and finishing works, I could not learn that the masters as a
dy, or any class of them, had entertained any proposals for any modifications of the existing law.
understood, however, that in the Lancashire district the great majority of the bleachworks' masters
re decidedly opposed to any further legislation. In Scotland I was informed that one or two meet-
gs of them were called to consider the subject of this inquiry, so far as it affected them, and I
ped to have received the result from a gentleman who took a leading part in the matter, but I failed
do so. The general feeling, however, of the masters there, as expressed to me, was much less
rongly opposed to further legislation than in the Lancashire district.

25. In the Lancashire district I met representatives of the workpeople in printworks, and both there
d in Scotland of the workpeople in bleaching, dyeing, and finishing works. There did not appear to
in Scotland any organization of the workpeople in printworks corresponding to that in England.
both countries, however, and in both classes of trade, the workpeople, both as thus represented,
d so far as I could learn their views individually, are anxious for an assimilation of the existing law
the Factory Acts in all main points. It appeared to me that their desire was real and sincere, and
ared by quiet and steady workers, and not an artificial result of mere agitation, as is sometimes
ggested. See Nos. 30, 38–41, 53, 83 as to printworks, and *passim* as to bleachworks, &c.

26. As regards the operation of the Acts in question in Ireland, there seemed under the circum-
nces, so little calling for any personal inquiry, that I did not think it desirable to occupy time by
siting that country. There are hardly any printworks. Most of the bleachworks are of a kind as
which I had not occasion to make inquiry. As regards warehouse employment, which it appeared
s the main subject left as regards the operation of any of the Acts in question, an inquiry and
port were very recently made to you by Mr. Lord, so lately as the year 1866, and further inquiry
emed unnecessary. See Children's Employment Commission, Fifth Report, pp. xviii., xix. and 167,
2–175, 188–195. Also infra, par. 325.

27. The two classes of Acts which form the subject of inquiry, though relating to kindred subjects, Division of subject under two heads.
already pointed out, differ widely in their principles and effects, and it is convenient in considering
em in detail, to treat of them and the trades to which they apply under separate heads, taking first
ose relating to printworks.

Printworks.

28. There are three Acts relating to printworks. The first and principal is the 8th & 9th Vict. c. 29., Printworks Acts.
itled "An Act to regulate the labour of children, young persons, and women in printworks," commonly called the Printworks Act. The second is the 9th Vict. c. 18, and merely amends two erical errors in the first. The third is the 10th & 11th Vict. c. 70, and is entitled "An Act to amend the law as to the school attendance of children employed in printworks." The three are commonly d here spoken of as one.

29. By the first Act (s. 2) a "printwork" is defined to mean "any building or shed, and any part thereof, within which any persons are employed to print figures, patterns, or designs, by means of blocks or cylinders, or by means of any other tool, instrument, or mechanism, upon any woven fabric of cotton, wool, hair, fur, silk, flax, hemp or jute, either separately or mixed together, or mixed with any other material; or upon any felted fabric of wool or fur, either separately or mixed with any other material; or upon any cotton, linen, woollen, worsted, or silken yarn."

30. This Act places printworks under the jurisdiction of the inspectors of factories, and contains pro- Nature of the Act.
sions as to certifying surgeons, certificates of age, school certificates, public clock, penalties, and mode

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of enforcing the Act, schedules of forms, &c., similar to those of the Factory Acts, from which they are to a great extent simply copied, except as regards the amount and regularity of school attendance required, which are much less than under the Factory Acts. It imposes certain restrictions, which are stated below, on the employment of children and females, but makes no provision as to meal times, holidays, lime-washing, machinery, or accidents, on all which points the Factory Acts contain strict regulations.

31. The word "child" is defined, as in the Factory Acts, as a child under the age of 13 years, and no child under the age of 8 years may be employed. (SS. 2, 19).

32. A "young person," however, is defined as meaning, not as in the Factory Acts, as between the ages of 13 and 18, but as between those of 13 and 16, but practically this is immaterial.

33. The word "day" is defined as meaning from 6 a.m. till 10 p.m., and "night" as meaning from 10 p.m. till 6 a.m. (s. 2).

34. No child or female may be employed during the night (s. 22).

35. A certain amount of school attendance is required from children, but the provisions relating to this are repealed by the 10 & 11 Vict. c. 70, which substitutes other provisions noticed more fully hereafter, but which allow of intervals which may amount to days, weeks, or months, without any school attendance.

Long hours of employment allowed.

36. There is no further restriction as to employment. The result is that children from 8 years of age, and females may be employed daily from 6 a.m. till 10 p.m, without any interval for meals or otherwise, except in the case of children on any days on which any of them may be attending school, and males over the age of 13 years may be employed without any limit.

Requirements as to school attendance.

37. The provisions as to the school attendance of children now in force under the 10 & 11 Vict. c. 70. are to the following effect:—No child can be employed in a printwork without a certificate in a prescribed form, which excludes Sundays, that the child has attended school for at least 30 days and not less than 150 hours during the half year immediately preceding the first day of employment or re-employment. This attendance must be between the hours of 8 a.m. and 6 p.m., and no attendance of less than two and a half hours is to be reckoned as part of the 150 hours, and no attendance on any one day for more than five hours is to be reckoned for more than five hours. A like certificate must be obtained at the beginning of each period of six calendar months during which the employment is continued in that printwork; but there is no further provision as to the times of school attendance.

38. The result is that the required amount may be made up at intervals regular or irregular, short or long, and varying in different works, or in the same works at different times to any extent within the above limits. A child might make up the amount by attending school daily for five weeks consecutively, and thus might be employed for 21 weeks consecutively without any school attendance during this period, but it does not appear that in fact the attendance is ever made up in less than six weeks.

39. Thus under the Printworks Act the latitude of employment allowed in the case of children, young persons, and women is much greater, and the provision made for securing the education of the young much less than under the Factory Acts, the standard of which has now been extended to manufactures in general with certain modifications.

40. But though this is the case it must not be supposed that the difference in the mode of working the law in printworks is equally great. What the amount of this difference as found in practice is will be shown hereafter.

Several branches of the print trade.

41. The branches of trade to which the Printworks Act applies are of several kinds, some closely resembling each other, and others of a different nature and commonly regarded as distinct trades.

42. The number of printworks furnished to me, about 170, includes those of all kinds in all the chief seats of printing, and some elsewhere, but does not include all, though I believe it does most in this kingdom. The descriptions too given in the returns of different printworks do not in all cases specify in which branch of printing they are engaged, and more than one branch is sometimes carried on in the same establishment. It is not easy, therefore, to give the exact number in each branch; but the scale of works varies so much that the mere number alone if given would be no guide to the relative importance of the different branches, or as to number of persons employed in them, or in other respects.

Calico printing.

43. By far the largest and most important branch, commonly spoken of as the print trade, and in which nearly all the largest works are engaged, is calico printing. This branch also presents the greatest peculiarities of feature as an employment, and as such may for the present purpose be taken as in most points sufficiently representing the other branches of printing. Calico printing, strictly speaking, is printing on cotton cloth, but printing on several other fabrics, such as delaine, linen, silk, and flannel is so similar that for practical purposes it is unnecessary to speak of them separately. The printing of muslin and of Turkey red cloth are important branches of calico printing, and are found more particularly in Scotch works. They are of the same general nature.

Its seats.

44. Calico printing is carried on in two principal districts, in which it forms the great bulk of the printing trade of all kinds, namely the Lancashire district, including the adjoining parts of Derbyshire and Cheshire, and the Scotch district in Glasgow and its neighbourhood. The total number of printworks of all kinds in the former district is about 80, and in Scotland rather more than 30. In the Report of the Children's Employment Commission in 1842 the number of calico printworks in the Lancashire district is given as 95. The number of these works therefore in this district has diminished, but this decrease has been more than made up for by the increased size and power of many existing works. The nature of calico printing will require to be more fully referred to presently.

Warp and skein printing.

45. Warp and skein printing is another branch. In this the threads are printed before they are woven into cloth, but there is no important difference in the manner of printing. This trade is limited in extent, a third probably of the entire trade being done by one firm, and the other works being "few in number, and mostly small establishments." The probable number of these houses in England is given as in warp printing 6, and in skein printing about 30. But the two where I found them are carried on together, and in one case in the same place with printing on cloth.

Tapestry carpet printing.

46. In the tapestry carpet manufacture also a peculiar kind of printing forms a part, the patterns being produced by printing the woollen warp afterwards woven to form the surface of the carpet. A

manufacturer in this trade refers to the difficulty which was found in separating the parts of his work subject to the Printworks Act from the remainder which are subject to the Factory Acts. This trade, however, is stated to be confined to only seven houses in this kingdom, four in England and three in Scotland, but most of them places of importance.

Woollen printing.

47. Woollen printing, *i.e.* printing woollen fabrics such as felts, druggets, and cloth for carpets, table covers, &c., is a separate trade from calico printing, from which it differs, however, in being in nearly all cases done by block printing only, and requiring few and comparatively simple processes. The works are few, and, as will be seen, on a comparatively small scale.

Floor cloth printing.

48. The remaining branch of printing needing to be separately noticed is the floor and oil cloth trade. The processes in this are very few and simple, and the works not on a large scale. The printing is all block printing. The chief seat of the trade is the London district, in which there are 16 works, and there are other works scattered in different parts of England, and not more than half a dozen in Scotland and Ireland together.

49. The Lancashire district includes printworks in all the above different branches.

Number and Sex of Persons employed.

50. The number of persons employed in printworks in this country is considerable. I visited works, including most of those on a large scale, employing more than 20,000 persons in all, and received returns from other works employing about 3,000 more. In the case of a few works the numbers include persons who, though employed in the same works, are not subject to the Printworks Act, but these will but little alter the figures shown. Calculating, as I was able approximately to do, for the other works and their probable size, I estimate that the total number of persons employed in printworks of all kinds in this country at not less than 30,000. Of these the great bulk are employed in calico printing or work of the same character, not more than a tenth probably being employed in woollen, carpet, or floor and oil cloth printing.

51. In the tables furnished from 70 works, chiefly calico printworks, these persons are distributed according to age and sex as follows, viz.:—

	From 8 to 13 years.	From 13 to 18 years.	Over 18 years.	Total.
Males - - - -	1,663	2,718	9,924	14,305
Females - - - -	920	1,231	1,844	3,995
Males and Females - -	2,583	3,949	11,768	18,300

52. Adding to these the probable proportions of each sex and age for other works, calculated separately for the English and Scotch works, as is necessary, I estimate the total number of children at upwards of 4,000; of young persons (between the ages of 13 and 18) at towards 7,000; and of women at upwards of 3,000; making a total of 14,000 persons whose labour would be affected by the provisions of the Factory Acts if applied to printworks. See No. 42 as to part of the trade.

Age of children.

53. Some children are employed from the age of 8 years old, but more commonly from 9 or 10. In the English printworks much the greater proportion of the children are boys, viz., about five boys to two girls. In the Scotch there is little difference between the two sexes as regards children. In teering, which is the chief employment of children, the proportion between the sexes seems to be a mere matter of accident determined by local circumstances.

Sex of persons employed.

54. But the proportion of females to males, taking the entire number of each, is much greater in the Scotch works than in the English. Of the numbers in the above tables, in the Scotch works more than a third are females, while in the English works only a little more than an eighth are females. In English works nearly two-thirds are men, *i.e.*, over the age of 18, while in the Scotch works less than a half are men. These differences, which it is important to notice, will be in a great measure accounted for presently.

55. In both the English and the Scotch works, according to the same tables, of the males between the ages of 13 and 18, more than three-fifths are under the age of 16, in fact about seven-tenths.

Number of children greatly diminished.

56. The change which has taken place in the print trade since the time of the report of the Children's Employment Commission in 1842 is strongly shown in the differences indicated in the above numbers as compared with those given in that report. At that time 5,614 children were returned as then employed in the Lancashire district alone and the number of children employed as teerers, if all the printing tables were at work, was put at 8,492; while it was estimated that in Scotland 5,000 children were employed as teerers, besides many children employed in other ways. The number of teerers, as given by the secretary of block printers in the Lancashire district is now only 1,400, including some in woollen printing, and that of the block printers 1,700.

Of young persons diminished.

57. The number of young persons employed in printworks in the Lancashire district is also now much less than it was at that time, being apparently about three-fifths. The number of adults, so far as can be judged by comparison with that Report, has increased by about a third in the same district.

Trade increased.

58. The production, however, of the trade at that time, or rather in 1840, was considerably less than as estimated in 1852 (see *supra*) and still more so than it is at the present time.

Decrease of block printing.

59. These changes are probably to be accounted for by the great decrease of block printing since the Report of 1842. This has been owing no doubt to a great variety of circumstances. In Scotland the large printing trade formerly carried on in shawl, &c. printing, at Paisley, has disappeared, which a former employer there attributes to a change of fashion. But the main cause of the changes referred to has no doubt been the increased use of machinery, especially the substitution to a much greater extent of machine printing for block printing. A calculation made in the Lancashire district, though not expressly stated to be confined to it, gives the total number of printing machines now at work as about 650, as against 500 twenty years ago, and the present machines as each producing considerably more work than formerly.

Increase of machine printing.

Number of machines in Lancashire district.

Teerer's greatly superseded.

How.

60. The increase of machine printing has proportionately diminished the need of employing children, each block printer formerly requiring one to assist him by spreading the colour used for printing. Even where block printing is continued the teering process is now in many cases in the Lancashire works effected by other means, in the case of two or three works by machines, but more commonly by

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spring tubs. By means of the latter more than one colour can be taken up by the block at one time, instead of each colour requiring separate printing. But it is said that such mechanical appliances can be used only for works of certain kinds, and that for some kinds teerers will probably always be required. The custom, however, in other works, and generally in Scotland, is to employ teerers for all kinds, and in England it does not seem considered that teering machines would be any great advantage in ordinary cases. They have been known for many years. The bulk of the printing, however, except in the special branches referred to above, is now done by machines worked by power, at which the principal workers are men. Many works are entirely confined to this; but a certain amount of block printing still exists, and is said to be likely to continue to exist. It is, however, usually merely as supplemental to the machine printing.

61. Apart from the printing by machine or block there are numerous other ways in which children and young persons and women are employed as formerly.

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ovement
ice 1842.

62. Apart from the changes indicated above and their results and the effect of the Printworks Act, the general character of the employment remains much the same as it was described at the date of the Report already referred to. Mr. Kennedy who then reported on the calico printworks in the Lancashire district, and is now himself an owner of calico printworks there, writing in answer to my inquiries from him as to the principal changes which have taken place since his inquiry, mentions the improved material condition of the workpeople, the substitution of larger and better buildings, the great decrease of block printing, and the great reduction of the hours of work for women and children generally.

ze of calico
intworks.

63. The calico printworks in nearly all cases are places of some importance, consisting of several buildings covering a considerable space and employing a considerable number of persons, usually from 100 up to several hundreds each, and in some cases nearly 1,000, and in one or two cases even more. It is mentioned of one large printwork, that it covers about 20 acres of ground, and the same firm have also another establishment in the neighbourhood. But it must be observed that the number of persons employed in the different printworks is by no means in all cases an exact measure of the relative importance of the establishment in other respects, owing to the much larger proportion of hand labour in certain cases.

oollen print-
orks small.

64. The woollen printing works are on a smaller scale: ten from which I obtained returns averaging 60 persons each.

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intworks
all.

65. Floorcloth works, from the amount of space required, employ but a small number of persons in one place. I am informed that 30 persons is an average number, and that few, if any, much exceed 100.

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ing steam
wer come
der the Act.

66. The use of steam or water power is not required to bring a place under the operation of the Printworks Act, but it is, in fact, general in calico printworks, in part at least of the works, except in certain separate branches of printing to which it is not yet adapted or not to any extent, *e. g.* skein, woollen, and floorcloth printing. I am informed of one case in which power is used for woollen printing, and to judge from the appearance of the cloth, successfully. It is possible that by this means the character of this trade may be considerably altered, and much of the hand labour dispensed with. But there appears no likelihood as yet of any important change in the nature of floorcloth printing.

STATE OF PLACES OF WORK.

67. Calico printworks, like bleach works, require a great amount of pure water, and are commonly in open situations, and from the nature of the work have plenty of space. The general condition of the buildings appears to have much improved since 1842. The greater part of the workers are in airy and comfortable places.

mperature.

68. The work places, however, are in some cases warm. Some of the places in which children work in connection with the printing machines are so, though in many works there is nothing noticeable in this respect, and the machine rooms themselves are cool.

69. The block printing rooms require a certain warmth to dry the cloth. This is stated, in the Report of 1842, to have ranged from 65° to 80°, and so far as appears, is about the same now.

oves.

70. The stoves also used in some cases are hot places of work. In a large Scotch work the stoves for finishing printed muslin in which a number of young girls and women were working were at about 100° by the thermometers. At the stenter stoves, however, which are now becoming general for this kind of work, the girls are usually outside, where the temperature though high is more moderate. In an English work some boys work in a hot stove of the old kind, in which the man was stripped to his waist.

ychouse.

71. The dyeing department as a place of work remains much the same as it is described in the Report of 1842, where it is said to be very wet and by far the most disagreeable part of a printwork. To appearance it is so, but I heard of little objection on the ground of health, and did not think it necessary to make much inquiry on this point. It is often almost filled with steam, so much so that sometimes a person can only see objects immediately before him. This is said to depend very much on the weather, and to be unavoidable. It would be most the case at the time of year at which I saw the works. There is nothing otherwise unpleasant in the atmosphere.

NATURE OF EMPLOYMENT.

72. The nature of the employment is very various, too much so to allow of doing more than point out some of the chief parts which need to be specially noticed. Speaking generally, apart from the actual printing, the employment throughout bears a close resemblance to that in bleaching, dyeing, and finishing works. The chief difference is in the greater complexity of the operations consequent on the application of patterns and colours. The greater the complexity and variety, of course the greater so far is the difficulty of regulating all parts of the work evenly.

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73. Printing in its higher and more important branches, is a very complicated art, requiring not only very great skill and attention, but a great variety of operations, including delicate chemical processes, some necessarily continuous for given, though various, lengths of time, and subject as a trade to many external disturbing causes, unavoidable in a trade largely dependent on fashions and seasons. The peculiarities and difficulties of various kinds, whether in this or other branches of the trade, as explained by those acquainted with them, are shown more fully hereafter and in the evidence.

alico printing.

74. Calico printing furnishes the fullest illustration of these. As this business depends so much on taste, a very important preliminary is the preparation or procuring of patterns, which are engraved or cut on the printing cylinders or blocks. This, however, does not necessarily form part of the employment in printworks, and designing, engraving, &c., where carried on are employments of an artistic or highly skilled kind, and with unimportant exceptions only men are directly concerned in any of these.

esigns and
ngraving.

nave been referred to a statement in which it is mentioned that probably from 90 to 95 per cent. the designs used by printers in this country come from France.

Variety of patterns.

75. The variety and the constant changes in patterns, and the modes of treating them, however, are directly one of the main causes of irregularities of employment in printworks, as regards the mass of he workers.

Of departments and processes.

76. In any calico printworks a great number of operations and departments are needed. These partments are enumerated, in the case of one large printwork, as 33 (including, however, some ot strictly forming part of the employment, such as carters, mechanics, &c., and others employing ery small numbers each, mostly men), and in the case of another as 25. The main departments, owever, common to works generally, including more or fewer subdivisions, or accidental kinds of ork, according to circumstances, are 4, viz., (1), the bleaching; (2), the printing; (3), the dyeing; nd (4), the finishing and making up departments. In some cases parts of the work otherwise distinct themselves, are so immediately dependent on others, as, in effect, to be regulated to a great extent y them.

Bleaching.

77. The bleaching is required to prepare the cloth for printing, and is usually, but not necessarily or all cases, carried on in the same premises. Though differing in some minor points not material to tice here, it is carried on in places of the same kind, so far as regards the employment, and in the same anner as the bleaching performed in ordinary bleachworks, but the cloth does not need finishing in s white or unprinted state.

Machine printing.

78. The machine printing is the principal department, and as a general rule is the measure of the ale of the works, the other departments depending on it.

Machines.

79. The number of printing machines, however, is in all cases very small in comparison with the hole number of persons in a printworks. Very few works have more than 20 machines, and the great ajority considerably less, down to five or six, or even fewer.

Their producing power.

80. The producing power of printing machines varies greatly, not only according to their size and nstruction, but even with the same machine according to the kind of work in which it is engaged, and her circumstances.

81. The machines with their necessary fittings are complicated and costly. In reply to an inquiry to the cost of an average machine, a large employer writes, "The cost of a six-colour printing machine, I should say, with all drying chests, &c., and fitted up complete would be about 500*l*. By reckoning 40*l*. or 50*l*. a colour up or down you would get a fair idea of the cost of printing machines generally. Of course in the more complicated sixteen and twenty-colour machines the drying and other fitting up would be more costly than the six-colour I mention."

82. Machines are made to print one or more colours at the same time, as required. There are achines constructed to print as many as 10, 12, and even up to 20 colours at once, but these are xceptional, and commonly only a few colours are printed by the same machine at one time.

Illustrations of this.

83. The amount of printing which can be performed in a given time by a machine attended by a w hands, as compared with what could be produced in the same time by the same number of hands y block printing, is very great. Some idea of this may be formed from the statement in Baines' History of the Cotton Manufacture," that one cylinder machine attended by a man and a boy could rn out as much work as a hundred block printers with as many teer boys, and that three-fourths of ll the prints executed in this country were then printed by cylinder machines. This seems to have een written about 35 years ago, though the date is not given, in my copy at least. According to n authority not much later, a mile of cloth could be printed in three or four colours at once by one achine in an hour. In common practice, however, owing to circumstances, especially the necessity f frequent stoppages and changes, the actual rate of printing, taking the average day, would be everal times less than that mentioned in this illustration.

The cylinders or rollers.

84. The same machines print patterns of all kinds, simply by means of changing the engraved copper ylinders or rollers and the colours as required. The stock of copper rollers required to be kept for is purpose is often very large, and of great value. In one printwork with 18 machines the value of ese rollers alone is given as 16,000*l*. This is stated to be not more than is needed. In larger works o doubt the value would be proportionately greater.

Flat presses.

85. Another kind of printing machine for a certain kind of work called the flat press from the ngraving being on a flat plate, is used to a small extent in Scotland, but this is not included in the erm printing machine as generally used.

Lengths printed at once.

86. The cloth is printed not in the separate piece but in great unbroken lengths, formed by joining ndwise a number of pieces as great as circumstances will admit, so that the machine may run as long s may be without interruption. The roll, as it is called, or set of pieces so joined, is often only five or en pieces, though it may be many more, up to 50 or 100; but from 20 to 25 pieces of 25 yards is said o be an average run.

Change of rollers, &c.

87. The printing machines, owing to their complex nature, require to be very carefully prepared nd adjusted before being started on a given piece of work, particularly where several parts of the attern are printed at once, as each part must fit in with the others with perfect accuracy. The time equired for this is considerable. When the quantity of cloth required of given patterns and colours s printed off, more or less change must be made in the rollers and colours. When the quantities equired at once of the same patterns and colours are small, as is very often the case,—and it seems that he smaller works are more liable to this, on account of the orders being smaller,—these changes are of ourse very frequent. The time which they take varies according to the number of colours and other ircumstances. According to a manager in a large work,—"To change six rollers and colours takes on an average, say an hour, not more. To change the colours only would take less." Of course there re cases in which much more time would be needed. Even when there is no change in the patterns r colours, a stoppage for any length of time, it is said, causes much more than an equal amount of delay, owing to the effect of the stoppage on the colours themselves, involving further loss of time in starting again. It is thus an object to avoid as far as possible any interruption in the printing of a roll r set of pieces capable of being printed off continuously.

A great loss of time.

88. Owing to the time required for these purposes, though the workers are engaged all the time in ne way or other, a machine itself is actually running only a portion of its time, greater or smaller,

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according to circumstances. Where a machine prints a great number of colours, though when going it produces a great amount of effective work in a given time, requires a very long time to prepare it for starting. Where also the machine is comparatively simple, still if the changes are frequent its working time is greatly reduced. In a case of the latter kind it is stated that the machines individually are standing more time than they are going. A manager says that in seven years he has never happened to see all the seven machines going at once.

By whom attended.

89. The printing machines are attended by men, one printer to each, with a back tenter, and it may be other regular or occasional helpers. But boys, and occasionally girls are employed in connection with these machines, usually one or two to each machine. In some cases these are children, in others older. In some cases all are in the machine room itself, but in others those who "plait down," which is the work of most of the children, are in a separate room. This varies according as the cloth comes out into the one place or the other, after passing from the printing machines over the hot chests by which it is dried.

Resemblance to machine paper-staining.

90. The occupation of the younger helpers in the machine department is almost identical with that of children in the machine room in paper-staining works as described by Mr. Lord in the Appendix to the First Report of the Children's Employment Commission, 1862. Indeed, with scarcely any alteration except putting cloth for paper as the material, that description might almost have been written for calico printworks. Mr. Lord's description is as follows:—

"The duty of children who work in machine rooms consists mainly in laying or 'plaiting' down the paper in certain lengths as it comes from the drying rooms, or in rolling up the printed paper, and in the processes incidental to that work, with the occasional variation of assisting the printers by removing and washing out the colour boxes, felts, and rollers, when the machine is at rest, and fetching the colour and paper when required, and in some cases in watching to see that the paper passes smoothly under the various rollers of the machine."—Children's Employment Commission, First Report, p. 120.

Plaiters down.

91. The plaiters-down in some cases do what their name implies, *i.e.*, plait a length of cloth in short folds as it comes dried from the printing machine. But in a great many cases the folding is really done by means of swinging rollers, which apparently might be used in all cases, the plaiter-down, while the machine is going, being merely wanted to watch and to give notice if anything goes wrong, so as to prevent injury to the cloth. There is usually one to each machine, but in some cases a much smaller proportion with a few adults.

Block printing.

92. Some works have a block-printing department, but some of the largest have none. It is required only for certain kinds of work, for which machine printing is not suitable. These are chiefly those in which certain colours have to be put in, or where the size of the pattern would require too large a machine.

Teerers.

93. In block printing the work of the teerers, where they are needed, is to spread the colour on the sieve and help in odd ways, just as it was formerly. In some work a block printer needs two helpers. Where teering machines or spring tubs are used in place of teerers, a certain proportion of children are still needed to teer for printers when engaged on certain kinds of work, and others to help in miscellaneous ways.

As in paper-staining.

94. These occupations also are substantially the same as described by Mr. Lord in the case of printing paper by hand in paper-staining works. I quote his description of this also:—

"The process of printing by hand is conducted by a man and one or two boys; each man has a table before him, on which is fastened a blanket pad or cushion; on his right hand, and in rear of him, is a square trough filled with a semi-fluid elastic substance, the surface of which is in contact with a covering of oiled tick or cloth; upon the upper surface of this cloth is placed a square sieve, on which the colour to be used by the printer is spread or teered by one boy, while the other, if there be two, or the same if only one, from time to time draws the printed paper over a stand from off the printer's pad, and lifts it up with a crutch to dry, hanging it in festoons on moveable rods laid across a framework of parallel beams fixed on the roof."—(Same Report, p. 119.)

Other printing departments.

95. The preparation and engraving of patterns on cylinders or blocks, where these are carried on in the works, the preparation of the colours for the printing, and drying or hanging the cloth after it is printed, form parts of the printing department.

Subsidiary processes.

96. The actual printing, however, is only part of the means by which the ultimate effect of the pattern is produced. A variety of processes, differing according to the kind of work, are required afterwards to perfect or complete what the printing has begun. The printing in all cases gives the form of the pattern, but the colour has often to be given or brought out by other means.

Dyeing department.

97. The greater part of these processes may be included as forming the subject of the dyeing department, which is a very important part of a calico printwork. The processes in the dyehouse consist in passing the cloth through liquids of various kinds, whether dyes, or water containing other substances, or plain, for mere washing, by means of machines, called by different names, according to the process performed in them, as dunging, dyeing, soaping, washing, &c., but requiring the same kind of occupations.

Other processes.

98. There are other processes in use for bringing out the colours or perfecting the printing process, not connected with dyeing, such at steaming; but these appear to be mainly attended by men, and not needing special notice for the purposes of this inquiry.

99. So far as processes are concerned, it is apparently in the dyehouse department that the chief difficulties of limitations such as those of the Factory Acts would be found.

Finishing and making up.

100. The finishing and making up departments are, as remarked in the case of the the bleaching, substantially the same as in ordinary bleaching and finishing works.

Female block printers.

101. In the Scotch works many of the block printers are females, commonly described as grounders. In the English district, however, the employment of females as block printers is altogether exceptional, being almost confined to two works, and the present rules of the block printers' society do not allow of females beginning this employment in future.

Workers in colour shop.

102. In the colour shop, where the colours are prepared, the workers are mainly men, with it may be a few boys as helpers.

In dyeing department.

103. In the dyeing department, the actual dyeing process while going on is attended to usually only by men, though boys help in putting in and taking out the cloth from the dye becks or dyeing

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Females in Scotch works.

Few young boys.

Intermittent employment.

The dyeing process.

Its duration.

Mode of conducting it.

System of hours in dyeing.

Washing.

Blue dyeing.

11s. Boys are employed in various parts of the dyehouse work, particularly at washing machines, generally in helping wherever they are wanted. In the English works the dyehouse hands are ly all men and boys, but in the Scotch works females also are employed to a large extent in this rtment. The boys in the dyehouse are commonly, but not in all cases, over the age of 13. In a Turkey red dyeing and printing work in England, which is worked throughout under the lations of the Printworks Act, nearly 50 of the boys in the dyehouse are half timers.

14. In the dyehouse there are frequent and sometimes long intervals while the processes are going n which the individual workers, though on the spot, are not actually at work, but either only hing the processes, or waiting till their active services are wanted.

15. The nature of the dyehouse work however requires to be more particularly noticed in reference ie time occupied in the processes. The cloth is dyed in vessels or cisterns called dyebecks, con- ng the dyeing liquid, which is raised gradually to a certain temperature, and through which the is kept continually passing round by means of machinery. The process varies in duration rding to the various dyes required, but in the usual kinds is between two and three hours. Some s take rather less, and others an hour or so more than the times mentioned, but the average time, hly speaking, is probably about two hours and a half. The process when once begun must be nued without interruption till it is completed. This, it is said, is absolutely necessary, as otherwise cloth would be spoiled.

16. In addition to the time taken by the process itself a short time is required for preparing the , and putting in the pieces of cloth to dye, and taking them out again when dyed.

17. When one set of pieces is dyed and taken out another set is put in, and so on through the day ften as may be required.

18. More than one beck however can be attended by the same set of hands, and so worked together ne set, but the dyeing process in each must begin and end at different times, to allow of the ers making the required changes at each in succession, at the proper time in each case. Thus in same set the process at one beck overlaps that at another beck, and the dyeing is going on from the nning of the first to the end of the last, which may be considerably behind the first. The times as between the different sets are likely to differ more or less. A dye completed at each beck in a orms a round, and the full day's work consists of so many rounds, but it may happen that a round ly partially completed, one or more becks in a set being left unworked, in which case the time ld be so far shortened.

19. This system will be best understood by reference to a table drawn up from a statement kindly ished to me by Mr. Thom, a large employer, as a specimen of the routine in his dyehouse, to which prefixes the remark, "We work our dyebecks in sets of fours, that is, one set of men take four ecks."

20. This table is as follows:—

——	Commences.	Finishes.	Commences.	Finishes.	Commences.	Finishes.	Commences.	Finishes.
Beck -	6·10 a.m.	8·30 a.m.	8·50 a.m.	11·10 a.m.	11·30 a.m.	1·40 p.m.	2·0 p.m.	4·20 p.m.
„ -	6·30 „	8·50 „	9·10 „	11·30 „	11·50 „	2·0 „	2·20 „	4·40 „
„ -	6·50 „	9·10 „	9·30 „	11·50 „	12·10 p.m.	2·30 „	2·50 „	5·10 „
„ -	7·10 „	9·30 „	9·50 „	12·10 p.m.	12·30 „	2·50 „	3·10 „	5·30 „

21. In reference to the above Mr. Thom states:—

"The above is the average of a week. Some styles may be a shorter time, and some a longer time; but, h putting short-time dyes to becks that have had long-time dyes, the above average is made pretty ular. To finish the above so as to leave all right for morning takes to about seven o'clock. We cannot the machinery at all during dyeing hours. If subject to some Act in the dyehouse different from our ent one I should discharge all young persons at once."

22. In this table, it will be observed, each dye, with the exception of two which take 10 minutes , takes 2 hours 20 minutes, with 10 minutes before starting the first, and 20 minutes interval ween each, and therefore doubtless 10 minutes for taking out the last set. To complete the whole nd of four complete sets of dyes would thus take from 6.0 a.m. till 5.40 p.m.

23. The above statement agrees substantially with what I found elsewhere in reference to the most al kind of dyes, and sufficiently illustrates the nature of the process in other cases. But the length lyes varies with the style of work, and the styles of work required naturally vary more or less either different printworks or in the same printworks at different times, or even at the same time as regards tions of the work.

24. After the dyeing is completed a certain though short time is taken for washing, and it is said t in some but not all kinds of work till this is done the cloth is not in a safe condition to leave the night, so that in such cases this work must be later than the dyeing.

25. In a few works there is a different kind of dyeing called "blue dyeing," in which the system altogether different, but resembling so far that the operation when begun is carried on till it is com- ted. The cloth is repeatedly dipped in a series of vats for a few minutes each time, and lifted out l exposed to the air for a few minutes between each dipping. The process can be performed in an ur and a half in the early part of the day, but takes longer as the day goes. The dyeing is done men, but boys are employed to hook the cloth on the dipping frames, and help in other ways, and kept on the spot to be ready whenever they are wanted. Fuller descriptions of this process are ven in Nos. 21, 29.

26. This kind of dyeing however is very limited. I was informed that it is now carried on in only ee printworks in the whole Lancashire district, and in two of these where I found it the amount of rk now generally required is easily accomplished some way within the stated hours. This branch refore need not be further noticed, and when dyeing is spoken of in other places it refers only to e other kinds usual in printworks.

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Females in finishing stoves.

117. In the Scotch printworks a great number of females are employed in finishing muslin in st in the same manner as in bleaching and finishing works.

Attending machinery.

118. Throughout the whole of a calico printwork, exclusive of block printing and some warehouse w a great part of the actual work is done by machinery, through which the cloth is always passin or out in long unbroken lengths, and the work of boys and females consists in a great measure in gui or watching the cloth as it passes through the various machines. Of these the drying machine various departments are an important part.

Warehouse work.

119. Warehouse work of different kinds is common to both the English and the Scotch printwo and forms the greater part of the employment of females, except the teerers, in the former. few females are also employed in other ways, as in sewing the pieces together for the diffe departments, and a few of those thus engaged may be found in the machine room or the house.

Miscellaneous work.

120. There are besides miscellaneous parts of the work which need not be described, in which or females are employed in small numbers.

Woollen block printing.

121. In woollen block printing the occupation of the teerers is the same as in calico printing, very dirty, the children getting much smeared with the colours. The only other work is steam washing, and finishing in stoves, done by men.

Floor-cloth block printing.

122. In floor-cloth printing the boys are employed as teerers as in other block printing, but girls, and hardly any are children. The floor-cloth is drawn off the table, and hung over beam each part is printed, and requires no further process, but is merely left to dry. Before printed the ground is prepared by men in another department, which is called the manufactu part. The canvas is used in great widths, up to eight yards or so wide.

Hours of Work.

123. The stated or standard hours of work are very nearly the same throughout, viz., from 6 a.m 6 p.m., with meal times, and a short day on Saturday. The hour on that day is 1 p.m. in the c printworks in the Lancashire district, and 2 p.m. in the Scotch, the week in both being less than Factory Acts' week. Occasionally however there is an additional hour, till 7 p.m. on Friday. W the school is on Saturday blockprinters stop early for it.

In dyehouse.

124. But there are certain exceptions from this standard. In the dyeing department, though always in the whole of it, work is commonly continued through the day without regular meal ti and the nominal day is therefore completed so much earlier. But the actual time which dyehouse works depends more upon the number of the sets of work to be completed and the t required for them than on fixed hours, as will be explained below.

Excess of standard hours.

125. The actual hours of work however, owing to a variety of circumstances, vary considerably the above standard. Overtime is very general, though the extent to which this is carried varies much in different cases and in different parts of the same works. It must be borne in mind thro out that when one portion of the hands is very busy and working late the others, or most of t may not be so, but perhaps the contrary; still in the ordinary course of things overtime in one de ment, especially in a leading department such as the machine printing, is likely to involve overtim one or more of the others, and in busy times the greater portion of the hands are likely to be wor longer, though not all the same hours. In any one set of hands the children, if there are any, monly work with the rest within the legal limits. Where the day is 10 hours up to six hours over can be made between 6 a.m. and 10 p.m. by working in the meal times, though in fact there w no doubt be short stoppages for taking meals.

Extent of excess.

126. In the returns or written statements received from different firms in answer to the printed for inquiries, there are only four cases in which it does not appear that the usual hours are exceeded to extent either occasionally or frequently, and in almost all the excess is in effect said to be unavoid In these four no information is given on the point either one way or another, but in the only o these four works which is of any size I found, on visiting the works, that overtime prevails to a siderable extent, and two of the others are extremely small, only employing 20 persons between t In a fifth, which is a Turkey red dyeing and printing work, it is said that the usual hours of work never exceeded except in the Turkey red dyeing department in case of accident to machinery.

127. In these returns the limits o work when the usual hours are exceeded are very variously gi In some the excess is very slight or rare, in some the limits are not given at all, as being too uncer to state accurately. In most, however, the limit at night is given at various hours, ranging from 7. till 10 p.m. The extreme limits commonly given are 8 p.m. and 10 p.m., the former rather, but much more frequently than the latter. In some others it is 9 p.m., in one 9·30, in two 8·30, a only two earlier than 8, viz., 7 p.m.

128. The limits at night, where late, are in some cases mentioned to be only exceptional, and doubt apply to only a portion of the works, as must also be the case with work before 6 a.m after 10 p.m. mentioned in only four returns.

Frequency.

129. The frequency of the excess of the usual hours, is, according to the returns, very variable. some it is not given, in others it is described only as irregular, but where estimated in days, weeks months amounts in some cases only to short periods up to a month or two, and in 18 to three mo and upwards, but only in two or three cases to above six months. The average of the cases given three months and upwards is about four months. The excess is probably computed as including t when there is overtime in any part of the works.

Instances.

130. A return furnished by a large calico-printing firm contains an elaborate table, showing in detail the hours worked by each department during the past year, 1867, which, however, is state have been a more than usually busy year at this establishment. It is also remarked that the t "shows the time the departments wrought, but all workers would not always work the full t "stated." The stated hours of work in this establishment are 58 in a week, 11 of them on Friday, seven on Saturday, and 10 on other days.

131. The machine printing or principal department, including in this a warehouse and the co shop, out of 305 working days made full time on 109 days, and overtime on the remaining 196 viz., for one hour on 58 days and for two hours on 138 days. Neither this department nor

engravers, who never made less than full time and very seldom more, made more than two hours overtime on any day. A.

132. The other 20 departments on the average made overtime, ranging from one to six hours a day, on 213 days, and, with the exception of one small department, which had only 219 working days, made on the average about 303 working days, none less than full. This is exclusive of overtime in excess of six hours made by one department in which there are only men and one boy, which made overtime for seven hours on 58 days, and for eight hours on 24 days. All these 20 departments made overtime for one, two, three, and four hours each, all but two for five hours each, and all but one of these two and another for six hours each, on one or more occasions. The overtime, however, fell most on certain departments, and particularly as regards females or boys on the bleaching, the dyehouse, work at cans of various kinds, stenter stoves, and finishing and warehouse work.

133. The dyehouse, in which besides men there are many boys and several females, made full time on 44 days, and overtime on the remaining 261 days, and on 79 of these for six hours a day, or overtime amounting in all to some way upwards of a thousand hours, *i.e.*, nearly 18 weeks of 58 hours, or a third of a year in excess of the stated amount.

134. The following table shows the average of the overtime, omitting fractions, exclusive of that referred to as over six hours, in these 20 departments:—

Overtime for -	One Hour.	Two Hours.	Three Hours.	Four Hours.	Five Hours.	Six Hours.
Made on - - -	32 days	60 days	48 days	35 days	15 days	22 days

135. The above return is from a large establishment, employing between 600 and 700 persons, of whom more than half are women, young persons, and children, more than a third being females; very few, however, are children, viz. only 19, and these are confined to the machine printing and dyehouse departments. Several of the departments consist of quite small numbers, but in almost every case a portion of the hands are females or boys, and in full half the females are in excess of the males, though not in the three larger departments, viz., the machine printing, the dyehouse, and the engraving.

136. This instance no doubt represents an exceptional amount of work, taking all parts together, but is given as the most complete and exact account of a printwork which I have obtained, and as characterizing in an unmistakeable manner what the present law admits of in practice, and indicating the parts of the work in which regularity commonly prevails or varies most.

137. In another large work the averages per month for the same year were as follows, viz.:—machine printing room 25 days, madder dyehouse 27¼ days, finishing room 25¾ days, bleach croft 27 days, blue dyehouse 22 days; but in these works overtime is returned as occurring in about six months in a year, and to the limits of 8, 9, or 10 p.m. The dyehouse worked through the night for three months in that year, but as this was by relays it is perhaps not included in the average. The printing machines at the beginning of the year were running till 9 p.m., and would continue to do so, it was supposed, perhaps three months if the demand continued.

138. The printing departments are commonly the most regular, except the engraving, where there is any. The statement that "the overtime occurs chiefly in the subsidiary department of these works," which is made by one of the larger firms, is only an illustration of what is found in different degrees in most cases. The printing departments the most regular.

139. In the machine printing overtime till 7 or 8 p.m. is very commonly made, and continued for longer or shorter periods, often for several months. In the case of one large Scotch work it is mentioned that, taking the run of years, the machines work about half the year till 6, the other half till 8 p.m., and that before the late increase in their number they had worked "till 8 p.m. for at least 9 months consecutively except on Saturdays." In another large Scotch work the printing department generally works overtime eight or nine months, which is generally till 8 p.m., or sometimes 7, and a year or two ago for the 12 months worked regularly till 8 with very little exception. Overtime in printing department.

140. In one large English work the machines, though greatly increased in number, are the latest department, and had lately been working till 7 or 8 p.m. for four months about equally, as well as for some time afterwards, and then till 6, which it is said, "will give the usual average until 7 p.m." But it is said, though only as an approximation, that with the new arrangements "we should expect to finish "at 6 p.m. for about one-third of the year. Hitherto when business has been good we have rarely ceased "working at 6 p.m., it being principally 8 p.m." In a small English work the ordinary time of working in the machine department is given as till 7 p.m.

141. In some cases the machines work till 9, and even 10 p.m. is mentioned, but this appears to be very rare now. In a comparatively small English work it was a common thing before the American war for the place generally, as a whole, to work till 9 p.m., and it had done so for nine months together. A large English work in which the machines were running till 9 p.m., and might continue to do so for three months, has just been referred to above.

142. The block printers' society in the Lancashire district within the last two years or so have made a rule to work only from 6 a.m. till 6 p.m., and this appears to have been kept to for a year or so, but to have been departed from of late in several cases. The secretary states that all shops are subject to working overtime when busy. In certain cases they work in relays, the second working till 10 p.m., but in cases where this is mentioned it is said that it is done without teerers and with a view not of doing more work, but of keeping more men employed. The extent to which the rule is enforced is likely to depend on the state of the block printing trade for the time being. The demand for block printing styles is stated to have increased within the last three or four years, and may of course decline again. Block printers' regulation of hours.

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Overtime.

143. There does not appear to be a like general rule amongst the Scotch block printers, though at one place it is mentioned that they will not work after six o'clock. But at another the employer states that the men "have worked till 10 p.m. for about three months within the last two years " and their teerers too;" and that the "female block printers work about three or four months in " the year to what is called 8, but what is really 7.30." In another, the teerers used to work late, occasionally till 9 or 10 p.m., but lately instructions have been given that they are not to work later than 7 or 7.30 without special orders.

Instances of short hours in winter.

144. In a large Scotch Turkey red printwork it is mentioned that the block printers only work by daylight in winter, and the same custom was mentioned to me in an outlying English calico printwork where the style of printing is of a special and expensive kind.

Other departments more variable.

145. The work in the other departments is usually more variable than in the printing, though much depends on the arrangement of the works, and the styles which are being produced for the time being. Owing to differences of this kind and other circumstances, work falls on different departments differently in different cases, and not always in proportion to the amount of printing which is going on for the time being. In ordinary cases any considerable increase in the amount of printing must natually increase the amount of work of other kinds, though less uniformly in some parts than in others.

Dyehouse, drying, &c.

146. The departments in which overtime prevails most commonly to the greatest extent are the dyehouse and also other parts of the employment which come late in order, whether late in the process of production and fitting for sale taken as a whole, or late relatively to certain stages of the work on which it is convenient and in many cases necessary that a further process should follow without any important interval, such as a night. The drying the cloth as it comes from the dyehouse or washhouse is an important instance of the latter kind, as is also the washing, but the latter is generally included in the dyehouse department.

147. It is probable that where in the returns or elsewhere work is said to be carried on up to the later hours named, without the parts of the work being specified, this applies chiefly to the dyehouse, and other parts of the work of the kinds just referred to, and not to the printing department.

148. From what has been said with regard to the nature of the dyeing process, it is clear that to increase the production at all, the working hours in the dyehouse, or at least a portion of it must be lengthened considerably. The time must be long enough to complete one or more additional dyes. Thus, in a large Scotch work, where it is stated, "In average work we make four rounds " by 5.30 p.m. and wash up and leave by 6;" with five rounds the time is about 8.30 p.m. and with six rounds from 10.30 till 11 p.m., and in this place, "Last year we made six rounds a day for about a " month, not every day, but, say, on alternate days and occasionally for two days together," and " on " the average probably the dyehouse works about six months till 6 p.m., and for the remainder " of the year till 8.30, or the later hour for the six rounds." So in a smaller Scotch work where the dyehouse starts at 5.40 a.m., at which time boys who go to the dye vessels come, "They can get three rounds done by 4 p.m., four by towards 8 p.m., and if they make a fifth it takes " till about 11 p.m. This includes the washing which follows the dyeing and takes from three-quarters " of an hour to an hour. 14 hours a day is considered standard work in the dyehouse, and I should " say that, taking the year round, the hands in it work that on the average, *i.e.*, till about 8 p.m."

149. In an English work "When there is full work we make on the average five rounds in a day " in the dyehouse, which takes to about 8 p.m., though sometimes we can manage the five rounds by " 7.30 p.m. Occasionally we may be pushed or delays may occur requiring the dyehouse to work " later than 8, but this has not been the case, I think, within the last 12 months."

150. In another, "Certain departments, such as the dyehouse and finishing, are frequently employed " from 6 a.m. till 8 p.m., or even to 10 p.m."

Finishing and warehouse.

151. Overtime, in some cases up to 9 or 10 p.m., extends to the finishing and warehouse departments also. These departments coming late in the production are affected by pressure of work and delays in the earlier, and the object to be gained by extra hours is more immediate and certain, as by this means the goods can be finally completed and got ready to send off, it may be, the same night.

Bleaching.

152. The bleaching, though the first stage and free from the peculiarities of the printing and later processes, is still liable to overtime from other causes, though apparently much less generally. In one case, the ordinary time of working in this department is mentioned to be till 8 p.m.

153. The account given above of the excess of the usual hours of work is taken from the returns furnished from different firms, or statements of employers or managers revised by them in writing, and may be presumed not to be overstated. Other evidence amply bears out the fact that the amount of overtime common is very considerable, and the workpeople's committee say that the excess "can be " proved by any amount of evidence which may be required."

Night work.

154. Night work being possible only for men and boys over the age of 13 cannot now well exist to any extent. It appears not to be considered desirable if it can be avoided, and is in fact quite exceptional, though in special cases it is sometimes adopted in parts of the work which admit of it.

155. In one case of a large quantity of cloth wanted on very short notice, night relays of men and boys over the age of 13 were employed for several weeks; but this "was the only occasion on which " we attempted to use a general relay of hands." At another place, when very busy, the dyehouse is worked with night relays, and was so for three months last year, as already mentioned, but though the work is a large one, the boys in the dyehouse are very few indeed.

Meal Times.

156. Though the Printworks Act makes no provision as to mealtimes, yet, with the exceptions stated below, mealtimes not less, in some cases more, in amount than those common in other kinds of work, and at or about certain fixed hours, are as a general rule allowed or taken; where they are not, which in certain cases is the rule in others only the exception, the mealtimes are reckoned and paid for as overtime. The allowance is, in England, not less than an hour and a half, viz., half an hour for breakfast and an hour for dinner, and in several cases with a short time for tea in addition, and in Scotland, the two hours usual in that country, viz., an hour for breakfast and an hour for dinner. An additional mealtime is also often allowed where overtime to any extent is made.

Where mealtimes not regular.

157. The exceptions referred to above are chiefly found in certain departments in which the operations are mainly and more immediately chemical, requiring given periods for their completion,

and in which the employment consists chiefly in watching and assisting at these. Thus, in the dyeing department it is the general practice for the hands, or many of them, not to have regular meal-times, but to take their meals individually as may be most convenient. The day's work is thus finished much earlier, and it is probable that men may often prefer this to interrupting their work and having to stay later. A case is mentioned in which they made great opposition to an arrangement of the latter kind made by the manager, so much so that some had to be dismissed (No. 43). A

158. In some cases, however, chiefly in Scotland, a full meal-time is taken in the dye-house as in the other departments. Thus in the works of Mr. R. Kay, near Rochdale, the dye house hands "have "the same time allowed for their meals as the other hands, viz., one hour for dinner, but it is sometimes "from 12.30 to 1.30, and at others from 1.30 to 2.30, and so on, according to the times at which the "dyes come out of the cisterns (No. 57). In the works of Messrs. W. Miller & Son, near Glasgow, "in the printing dye-house the hands always stop the breakfast hour at 9. They work through the "dinner hour" (No. 148). Other instances of the same kind are given. Often, however, part of the dye-house hands, viz., those whose work can be more easily interrupted, and in some cases the whole, have regular meal-times, more or less nearly approaching to those in the other departments.

159. In the bleaching department, in like manner, the practice of working in the meal-times prevails in many cases, but not so generally as in the dyeing. It is clear that it is no way necessary. The experience of a foreman in large Scotch works is very decided in favour of stopping regularly for the full meal-times (No. 128). In bleacl

160. Even in the printing, and other principal departments, where the work is of a kind which is capable of being stopped at fixed times, or so nearly so as to be practically the same, the practice as to meals is not uniform. In some cases, including works of large size, it is the custom for the printing machine department to work through the meal-times; in other cases the printing machines stop at, or nearly at, a fixed hour, though one or more machines may continue at work a few minutes or so to complete the particular set of pieces on which they are respectively engaged, each machine working independently of the others, though in some works, all stop at or before the hour. In printi

161. Block printers, as a rule, take the full meal-times, though a few may occasionally continue work then for some special purpose. The block printers indeed in a large Scotch Turkey red printwork are described as working in winter without any or with only one meal-time, but that is because they work only by daylight and take one or both meals, as the case may be, before and after work according in the length of the day (No. 142). In block ing.

162. In most departments in which meal-times are the rule in ordinary times, in busy times overtime is in many works made in the meal-times, though the extent to which this is done varies in different works. In some cases both meal-times are taken as working time, the workpeople stopping, however, a short time to take their food. The present system as to meals, and its effects, are a point complained of by the Workpeople's Ten Hour Bill Committee, who say, "in regard to meals we think that we ought to have proper time guaranteed for them" (No. 42). Working in the mealtimes is said to be very rare in the Scotch works except in the dyeing. Overtim usual me time.

163. Holidays, though not required by the Act, are, so far as I have learned, allowed. At the large works of Messrs. E. Potter & Co., the hands "have 10 days clear holidays in the course of the year." But the sub-inspector for the district mentions that "most employers require their hands to work at "the printworks on Christmas day and Good Friday, when busy," which has seemed strange to persons not aware that it is legal (No. 58). An employer not in the district referred to above remarks that "the "fixing of holidays by law would not work as well as allowing them to be regulated by custom in the "various districts," and adds, "I speak now from an experience of 25 years, during which we have "always worked Good Friday and Christmas day, and never had a single application to alter them" (No. 51). Holi

164. The holidays now usual if they do not already satisfy the amount required by the Factory Act could probably in a short time be arranged so as to do so in a satisfactory way, the busiest time falling in the winter half year. There might no doubt be some difficulty at first in inducing the workpeople, if it became necessary to do so, to give up any usual holidays for the purpose.

165. Much of the work of females, young persons, and children, is merely hand labour, and though in other parts of the work in or amongst which they are engaged, machinery is now largely used, it is of a kind in which there seems no room for accident, or none which could be guarded against by any other practicable arrangements. Parts requiring to be protected, so far as I observed, generally are so. Nothing was brought to my notice with regard to accidents, and I did not think it necessary to give much attention to this point. Regulations with regard to the fencing of machinery similar to those of the Factory Acts, would, as appears to me, have little practical operation in printworks. Accidi Machine dangerou

166. The wages of children are usually from 2*s.* 6*d.* to 3*s.* 6*d.* a week; it may be a little more or less. In one place where they get 3*s.* 6*d.*, it is remarked that mere half-timers could not be got for less than 2*s.* 6*d.*, as that is what they get in the factories near (No. 63), the children in the printworks having the advantage of overtime money besides. In the chief woollen printing district, where children are very scarce, the teerers get 4*s.* or 4*s.* 6*d.*, or even 5*s.* a week, which is paid them by the block printers, for whom they work, "work or play," *i.e.*, even if the printer has no work, so as to secure the children. The half-timers in the factories near get 2*s.* 9*d.* or 3*s.* The children, however, are more commonly paid by the employer. The wages of females it seems are less than can be made by them in factories. Messrs. Potter remark, as a proof of the more attractive nature of employment, that printworks obtain for perhaps a less rate of wages for longer nominal hours a superior supply of labour to what a cotton factory can. The machine printers must be highly skilled and get good wages. The block printers, according to the statement of their secretary, when working by the day get 25*s.* a week, and some work by piecework. The general custom of the trade, as stated by an employer, in the Lancashire district, is to pay the wages fortnightly. In Scotland a manager states that the payment used to be monthly, which conduced to the credit system, but that weekly payment is now general. Wag

167. The employment in printworks appears to be in general of a healthy nature. Employers insist much on the fact that the work is lighter and more agreeable and less monotonous than work in factories. The general work of females in English printworks and much of it in the Scotch, certainly appears so, and is of a kind well suited for them. In Scotland a number are employed in Heal

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work which looks rather rough and wet for females, but they appear strong and healthy. The more or less heated temperature in which many of the children, and in Scotland part of the females, are employed, has been already referred to. A large Scotch employer considers the stove work of the females, even where they work outside the stoves, as in his case, to be the most exhausting part of the work, and too hot for long hours (No. 118). A foreman at another place says, that "it is necessary "for them in this work to stop for meal-times. They could not keep on sitting here by the stove "without a rest" (No. 123). This part of the work is of the same kind as that in bleachworks stoves.

Stove work.

168. The occupation of teering, though light, is certainly very monotonous in itself, but this employment, it seems, may often be varied, *e.g.*, by the child going out to fetch colours, or helping in miscellaneous ways.

Dyehouse work.

169. The Workpeople's Committee state, that "in parts of the work the workers are exposed to "deleterious drugs," and that in the dyeing department "the work is carried on in a close thick fog "of steam," which in summer is "almost unbearably hot" and in winter "almost piercingly cold."

Printwork employment healthy.

170. Notwithstanding the amount of colours or drugs in use and the temperature or nature of the atmosphere in parts of the work already referred to, I did not find any special bad results attributed to these causes. The main objection, so far as there is any to be made on the ground of health, to employment in printworks appears to be from the long hours and want of sufficient time for meals, where they prevail. These are admitted to be injurious and avoided as far as it is thought circumstances will allow.

EDUCATION.

Present system defective.

171. There is a general agreement that the educational provisions of the Printworks Act are unsatisfactory, and require amendment, but the grounds on which this opinion rests are by no means alike in all cases. All agree in desiring that the children should be sufficiently educated. The present system is objected to by some as failing to attain this end, and by others as more inconvenient to the employer than other systems which they think might be adopted.

How worked.

172. The manner in which the educational provisions of the Printworks Act admit of being, and are, in fact, very commonly carried out, affords some means of judging how far they are sufficient as a security for any effective education. When the school attendance is in any degree frequent, or regular, or both, as described below, this results simply from the wish of the employer, and not from any legal requirement.

Instances of regular school attendance.

173. A few large works furnish marked instances of the kind here referred to. Thus Messrs. E. Potter & Co. are aiming at a complete system of half days, the same as that in the factories, as their standard for the future, and "have almost (if not quite) succeeded in providing a double supply" of children for the purpose (No. 1). At the large works of Messrs. S. Schwabe & Co. I was informed that the children in one department attend school daily, and the rest on alternate days, both for two and a half hours, and that shortly the whole will attend daily. Messrs. Dalglish, Falconer, & Co., a leading Scotch firm, also send each child to school daily for two and a half hours, and for several years have made it a rule to take no child into their employment who is unable to read. I am glad to take the opportunity of thus referring generally to the two latter instances, as owing to communications which were hoped for not having been received they do not appear in the evidence.

Less regular attendance.

174. Such arrangements as these, however, take up an amount of time greatly in excess of the 150 hours legally required. The school attendance of the children is commonly at much longer and less regular intervals, the usual manner of arranging the times varying in different places, and being often also more or less departed from in the same place according to the requirements of the works.

The six weeks system.

175. The required amount of the 150 hours in the half year can be made up by attending school for six weeks on the five usual school days ($5 \times 5 \times 6 = 150$). This is the mode most commonly mentioned in the answers furnished from English printworks. It may not be meant in all of these cases that these weeks are usually consecutive, but it clearly is in several, *e.g.*, "they attend school six weeks (at "least) in every six months, generally six consecutive weeks in slack times." "We arrange it so that "each child gets its 30 days continuously each half year, that is 30 days at once." "As a rule they "are sent six weeks to school at a time." "At the expiration of the six months they go to school for "another term." At a large Scotch work, however, that of Messrs. W. Crum & Co., the children are sent to school for two months instead of only six weeks.

The week in a month system.

176. In other cases it is mentioned that they attend school for a week in each month, *e.g.*, "we have "found one full week per month to be the best arrangment." "The schooling of the children em-"ployed here is arranged thus: School one week and work three weeks." "A week at a time." "One "week or 25 hours per month."

Other systems.

177. In some they attend school usually two or three times a week, or thereabouts, though not always regularly.

178. In several cases the answer is only to the effect that the attendance is according to the requirements of the Printworks Acts. But it does not follow that the attendance is limited to this, or is altogether irregular, though it may often be so. Children are often sent to school more than the required amount when work allows of it. At one small printwork from which an answer of the kind referred to was sent, the school certificate book showed that one girl had attended from 8 to 23 hours weekly for 16 weeks, and for seven of them not less than 20 hours, while a boy had attended 132 hours in 10 weeks.

Irregular attendance.

179. But in some answers an absence of any regularity seems to be implied. In one return the answer is "When we can best spare them." In another, "Each child attending school makes 150 "hours during six months at irregular intervals, as is most convenient, on account of the work being "uncertain." Another, after reference to the required 150 hours says, "The children are ordered to "go to school at every opportunity, thereby securing ample school attendance beforehand, which "enables them to work several weeks without a break" (No. 85). In these cases the required amount may often be exceeded in fact.

The one day

180. In the Scotch works the plan usually adopted is for the children to attend school regularly each

Saturday for five hours, leaving off work early, *e.g.*, 9 or 10, for the purpose. Messrs. A. Orr Ewing mention that in addition to this they have evening schools, for which they pay the fees, from 7 till 9 p.m. in the winter half year, and that in the last winter they had 455 children attending these from their three works, of which, however, two are not printworks (No. 142). Messrs. Miller and Higginbotham also provide an evening school for those who choose to attend (No. 150).

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181. In a few cases, however, in Scotland, the children do not make up their time by this weekly attendance, but by leaving their work for a sufficient period, as already mentioned as common in the case of English works. Objections to this plan are pointed out by the manager of large works, in which the Saturday plan has lately been adopted in its place. The children might lose their places, owing to their having been filled up; "they forgot then in the interval what they had learned six "months before," and instead of going to school they might perhaps go to work elsewhere, as had been known, and yet bring a school certificate on their return (No. 145).

Exceptio

182. In two Scotch works also it is mentioned that instead of the five hours on Saturday the children now attend school twice a week, in one case for three, in the other for four hours (Nos. 115 and 139).

183. A system like that usual in Scotland has lately been adopted in England by the woollen block printers in the chief seat of that trade, and is thus described by the sub-inspector of factories for the district:—

The one a week s in Engla also.

"The children are sent to school on a Saturday morning at 8 o'clock and remain until 1 o'clock p.m., five hours school attendance being credited. It is a longer time than a child can keep his attention upon books. Half an hour is said to be allowed as an interval for play (No. 108).

The children, however, from these works often attend school on other days when not wanted for work. "We send them any time when they can get 2½ hours" (No. 100). A schoolmaster thought that the children from one of these works attended on the average eight or nine hours each week (No. 98).

184. The practice of sending children to school when they can be spared, though there may be no immediate occasion for it, is common in other printworks. Every such school attendance secures at least so much for the benefit of the child, and with the least inconvenience to the employer. If a busy time comes the children can work on the longer without interruption. If it does not, the result will probably be that the total amount of schooling actually received by the children is so far in excess of what is required.

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185. Whether, or how far, the actual amount exceeds the amount legally required will naturally vary according to the state of trade generally, or the amount of work in any particular establishment.

186. The uncertainty of the employment, particularly in block printing, and the frequent shifting of the children to other printworks, tend to increase the irregularity of school attendances. It is further said that in Glasgow it has been easy for children to procure certificates without due school attendance, but if so, this is not from want of provisions against it in the Printworks Act (8 & 9 Vict. c. 29 s. 43, 10 & 11 Vict. c. 70); but, as already shown, under one certificate of school attendance for the required amount the child may be employed for six months without going to school at all.

Irregular how incr

178. In a few cases where printing is carried on as part of or in close connexion with a manufacturing business the children employed in printing, though strictly subject only to the Printworks Act, attend school under the Factory Acts, as in English tapestry carpet manufactories, though in a manufactory of this kind, which I visited in Scotland, the children attend in the same manner as usual in other printworks there.

Cases of tendance if under Factory

188. Such being the usual modes of school attendance of children under the Printworks Act, it is not strange that the amount of education obtained by them should be found, as it is generally said to be, very limited. I do not share opinions which have been expressed that the educational provisions of the Printworks Act are practicably worthless, on the contrary, they appear on the whole to have done a considerable amount of good. In cases where I asked, the children generally, but not in all cases, said that they could read, and when tested showed they could do so, or had some idea of it. The general condition thus appears to be much above what was often found in employments till lately under no regulation.

Results o these sys

189. The requirement of a certain amount of school attendance has also, as shown, had the effect of drawing attention to the subject, and providing in practice for a considerably increased amount in many cases. Had there been no such requirement there is no reason to suppose that provisions for education would have in fact been made to any greater extent than in unregulated employments.

Benefits.

190. The intermission of work is also no doubt a physical benefit to the children.

191. It would be highly undesirable to repeal the existing educational provisions of the Printworks Act without replacing them by others, but if any other provisions are made it is very desirable that they should ensure a more frequent and regular attendance than the present provisions do.

192. The present system is much complained of by the sub-inspectors of factories in the principal printwork districts. The remarks of one of these, Mr Oram, on this point, as on others, will be found of much interest (Nos. 58, 59). He quotes one of Her Majesty's inspectors of schools in Lancashire, Rev. W. J. Kennedy, as writing with regard to the irregular school attendance of children in printworks. "The result unmistakably is that they are inferior in attainments to any other class of children whom "I inspect," and another, Rev. A. V. Hadley, as observing in his report for 1866, "I must record "my conviction that the provisions made by the educational clauses of the Printworks Acts are little "better than useless. The children employed in these works are the worst educated, as a class, of "any in the district."

The syst complain by inspec

193. The defects of the present system of schooling are felt also by persons more directly concerned in the employment. A manager of an English printwork, Mr. James McAdam, remarks:—

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"I do not consider the educational part of this Act worth anything. . . . . I have tried them (the children) several times, and find very little progress in them" (No. 43).

A manager of a large Scotch printwork, Mr. D. Crawford, says:—

"I question very much if all (the children) that stay for a year or two get to be able to read. Of the whole number here at one time, I should say that probably half cannot read without spelling" (No. 145).

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Another, Mr. J. Anderson, says:—

"It is almost indispensable that some further school attendance for the children should be required. Many have been for years backwards and forwards between this and other works, and attending school, but yet I cannot say that they can read correctly" (No. (148).

Another, Mr. James Millar, says:—

"The present amount of schooling, viz., five hours on Saturday, is very little use, at least to those who cannot read when they come. Hundreds of children have passed through these works who, coming here often at 10 or 11, could not read when they were past 13 and freed from school attendance; I should say hundreds" (No. 149).

In another large work, a foreman, whose duties in connexion with the school make him acquainted with the state of the children, who are numerous, says:—

"About half can read fairly, of the other half about half can read the second and third books without spelling, and the rest spell" (No. 136).

By workpeople.

194. The workpeople, as represented by their Committee, complain that the present system works badly, and is of very little use, and "desire that the law should make provision for the education of the "children as in factories."

Views of employers.

195. Employers share in the dissatisfaction with the present law on the subject, and would, so far as can be judged, be ready to accept a more effective system. Messrs. E. Potter & Co., while allowing that their own system might be somewhat difficult when the labour of children is scarce or attracted elsewhere, still think that "the print trade generally would by no means object to the adoption of "the system under which we are now working, viz., of alternate morning and afternoon work and "schooling." Messrs. Kennedy suggest this also. (See Nos. 4, 5.)

Half-time.

196. There are, however, many employers who apparently would not be willing to adopt such a system, and who think it impracticable. The difficulty would be very differently felt in different cases, according to the nature of the work and the number of children required, and the local circumstances. In some cases the number of children employed is so small that no important difficulty could arise. But there are cases in which the difficulty would no doubt be considerable, *e.g.*, where the proportion of children employed is larger, and the additional number available would be limited either by the want of population, as in the case of printworks far from towns, as many are, or by the existence of other works employing children in the neighbourhood.

Questions as to supply of children.

197. From causes such as these, the woollen block printers in the neighbourhood of Newchurch find a scarcity of children even now, paying them from 4*s.* to 5*s.* whether they are at work or not (Nos. 96 *seq.*). On the other hand, it seems to follow that the many neighbouring factories must be placed at a still greater disadvantage with regard to the supply of children by the less restricted employment open to children in these printworks.

198. In Glasgow the large printworks lie near together, as also do those in the valley of the Leven. In the latter, the supply of children is represented to be less than is required at times even now. Indeed, Messrs. A. Orr Ewing consider that to apply the half-time system to their Turkey-red printworks there, "would be tantamount to stopping one-half of our block printers." There can, however, be little fear of the want of enough children even for two sets in Glasgow, especially as half-time children, as I am informed, are but little employed in spinning and weaving factories there. This may be owing partly to the number of manufactures carried on there in which the employment of children has till lately been free from restrictions. The late extension of the law to these manufactures may lead to some alteration in this respect. The fact, however, of the usual dinner in Scotland being 2 o'clock is probably a great obstacle to the employment of half-time children.

199. The labour of children could, no doubt, if there were occasion, be considerably economized by the more general adoption of arrangements and appliances already found in use, though some of them it appears, owing to peculiarities of detail in the kind of goods printed, either usually or occasionally, could not be equally adopted in all printworks or for the whole of the work in them; but the cases could not fairly be distinguished as regards legal requirements. Even in Turkey-red printing, the most distinct kind of calico printing, and in which the help of children is said to be especially needed, the printers and teerers are employed in precisely the same way, and in Glasgow in the same places with those employed in general calico printing.

200. If a half-time system were applied to print-works generally, excepting Turkey-red printing, works in which the latter is carried on offering fuller employment would be better able to attract children than other printworks. An instance of how hardly this would work is afforded by the case of a large general printwork in the neighbourhood of the three large Turkey-red printworks in a country district (No. 115).

Educational test previous to employment.

201. The opinion of many not unnaturally appears to be in favour of requiring a certain amount of education previous to employment, to be carried on afterwards as may be found convenient without interrupting the usual day's work. This view has been fully considered by you as advanced in the case of other trades and manufactures.

No special obstacle to half-time from the nature of the employment.

202. So far as the mere nature of the employment of children in printworks is concerned, or at least the parts of it in which they are of importance and employed in any numbers, I could not find any special obstacles to a system of half-time beyond what are shared more or less by other employments. The main difficulty requiring consideration is that of obtaining a sufficient supply of children, a difficulty however not peculiar to printworks, but a system of alternate days might be found more convenient than one of half days, *e.g.*, in Scotland where the usual dinner hour is 2 p.m., or in cases where the place of work is distant from the house or school, or the work of the children is of a dirty nature. They are sometimes much smeared with the colours used, and a change of dress would be desirable.

Suggestions as to the alternate day system.

203. Mr. Oram points out reasons and quotes good authorities for making the option of the alternate day system more generally available than it practically is under the existing factory law (No. 59).

204. In an important department, viz., the dyeing, there would no doubt be difficulty in working a half-time system for children except one of alternate days; but children are but little employed in this department and do not appear to be regarded as so suitable as elder boys. In one case, that of a Turkey red dyeing and printwork working throughout under the Printworks Act, I found a large number, about 50 boys, under the age of 13 in the dyehouse; but this is quite exceptional, and even here it was doubted if there was really occasion for employing such young boys. A.

GENERAL QUESTIONS.

205. The question as to more general modifications of the Printworks Act or assimilating it to the Factory Acts in other respects also is one of more difficulty. The main practical objections fall under two heads, the one relating to the manufacturing and the other to the commercial aspect of the trade. The latter class are by far the more important, both in themselves and as the main ground of the former. Modifications of the law; how far practicable.

206. The difficulties arising from the nature of the processes will be gathered from the description of the work already given. Difficulties from processes.

207. The printing process can be stopped at or by stated hours, and often is so in fact. Stoppage of a printing machine before the completion of a given set of pieces is a loss, but there could be little difficulty in arranging so as to avoid this as a rule; it would no doubt be so avoided if there were occasion. Cases would no doubt still occur in which a machine could not stop till a few minutes beyond the stated time without loss, but these might without much trouble be provided for without keeping any of the boys or girls. The objections to stopping at stated times are much the same as those advanced in the case of the paper-staining machines, *e.g.* loss of time, not only directly from the amount of the stoppage, but indirectly from the necessity of re-adjusting the machine, spoiling of materials, &c. The conclusions also arrived at by you on this subject, Children's Employment Commission, First Report, pp. lxi.–lxv., in accordance with which the Factory Act meal times are now required in paper-staining works, appear to be equally applicable to the case of printworks. As to printing.

208. In block printing under a trade union regulation the factory hours, except as to half time for children, have been adopted by the calico block printers on a sufficiently wide scale, and for a sufficient period to show that they are not inapplicable to this branch of the trade. Care is taken to avoid by good arrangement difficulties which would arise in special kinds of the work, which cannot be left unfinished. According to the experience of the foreman in a printwork employing a large number of block printers, the results of a change from the longer hours, *e.g.* working till 8 or 9 o'clock p.m., are satisfactory, and "taken at the long run there is as much work done now as there was before." Block printers approach to Factory Acts.

209. The regulation, however, has been occasionally departed from, a fine being imposed by the union where the fact was known. The rule apparently was strictly observed for a year, but just of late has been less so. The power of enforcing the regulation no doubt varies with the demand for block printers, and if that much diminished, the regulation would probably become inoperative.

210. The bleaching is often spoken of in the same manner as the dyeing, as a continuous process which cannot be carried on under the factory regulations. But there is no practical difference in this respect between the bleaching in printworks and that in ordinary bleaching works. As to bleaching.

211. In like manner, in the finishing and making up department, so far as processes or kinds of occupation are concerned, there is no greater difficulty in stopping work at fixed times than in ordinary bleach works. Finishing and making up.

212. But in the dyeing department the nature of the work itself does not appear to admit of equal regularity, even when there is not an extra amount of work to be performed. The processes indeed which require long periods for their completion, and cannot be interrupted at stated hours, are commonly attended by men, but the work of boys, and in Scotland of females also, is dependent on them, and affected by their irregularity. Dyeing department.

213. In this department, notwithstanding the greater or less approach to regularity as to meal times often found, the strict Factory Act Regulations as to meals would no doubt in a great number of cases cause a considerable amount of inconvenience, and a feeling of dissatisfaction with the law which might much interfere with its working not only in this but in other respects. Some of the work people themselves best acquainted with the matter are not agreed that such regulations would be expedient or practicable, or, as it is expressed, that the hands "could play the bell hours." Nor do they appear necessary. The case is different from those in which the workers are actively employed the whole time. Meal times in dyeing department considered.

214. As regards this department a provision as to meal times, similar to that in section 8 of the Bleaching and Dyeing Works Act, 1860, with regard to the employment of males over the age of 13 in dyeing works would probably sufficiently meet the case and be expedient. Provision on the point.

215. The effect of this would be to allow the work of the dyeing department to be carried on throughout the day by men and boys over the age of 13, the boys being allowed the proper amount of time, but each taking it as convenient. This would not provide for the case of the females in the Scotch works, but it appears that a considerable amount of regularity as to meal times is found practicable there in their work, and so far as it was not boys could be employed in their place. It is represented that some workers do, in fact, take the place of others if need be to allow of men taking a meal. Thus the answers sent from a Scotch firm state:—"In the dyehouse a few take their "breakfasts 8 to 9, dinner 1 to 2, to relieve others," this being the only department in which the meals are stated as not regular, the regular meal times in others being from 9 till 10 and from 1 till 2.

216. With regard to difficulties from a limitation to the factory day in case of any process being in an incomplete state, or of an extra amount of work being required in busy times or occasionally, it must be remarked that a day of a stated length is fixed already, except for males over the age of 13, and the difficulty would not be new in kind, though it would differ greatly in degree, the present limits being so wide as to leave sufficient margin for such contingencies. Still, occasionally, work has to Limitation of hours.

A.

be carried beyond these limits by those qualified, and it is not always understood that this class is so wide as it is. An idea is entertained by some persons, and has been acted on, that boys from the age of 13 to 16 cannot be employed beyond the prescribed limits of 6 a.m. to 10 p.m., see *e.g.* Nos. 46, 118. This seems to have arisen from the fact of their coming under the definition of "young persons" in the Printworks Act, which however, as already shown, in no way limits the hours of their employment.

Objections on other grounds.

217. Another class of objections to assimilating the Printworks Act to the Factory Acts have been referred to as the more important. These are founded on the uncertainty attending a fancy trade largely dependent on taste, fashion, and season, as the print trade undoubtedly is, at least in important parts of it. In these the value of the productions depends in a great measure on their being in time for their particular season or purpose, and the particular kind which will be wanted cannot safely be calculated on and produced beforehand, at least to any important extent. Hence a greater amount of general work falls on certain seasons or times, and more so in proportion as establishments are smaller and have a less general business. The winter months appear generally to be the busiest. Also as the variety of kinds is very great, and the kinds wanted for the time being may involve very different treatments in the production, it may happen that without any unusual amount of general work extra stress may unavoidably be thrown on certain parts at different times.

218. Printers in some cases print their own cloth, and in others print for hire. Those who only do the latter, are thus in an analogous position to bleachers. A large printer of this class in Scotland states that the general custom there for these "job printers" as they are called, is not to get up the styles and patterns, but to be furnished with the copper printing rollers by their customers. The gentleman just referred to says, that printers of this class cannot see beforehand and regulate their work like those who print their own cloth, but it does not appear in fact much to increase the difficulty as to securing regularity of hours, and a manager in England says it does "so slightly as to make "little, if any, practical difference in this respect," (No. 43).

Orders.

219. The printing in any case depends in a great degree on orders. The main difficulty is caused by the fact of these coming at uncertain times, in uncertain quantities, and varying styles, often to be executed in a very short time, and liable to be cancelled if not completed within it. Many causes tend to delay orders, whether shipping orders or others, often to the latest practicable time, as is well enough known in other trades. The state of a market is likely to have considerable effect. "The keener the merchant is in watching the market the more pressure falls on the printer." In matters of fashion and seasons, and where much depends on styles and patterns, it is more particularly important to have as wide a choice and as late information as possible.

Overtime; how diminished.

220. No doubt long hours are often unavoidably caused in these ways, but it appears that as a general rule where there is good arrangement and the several parts of an establishment are well balanced, overtime prevails to a much less extent. If one or more parts are weak in proportion to the rest they are likely to have to do an extra amount of work in the long run. Where long hours have prevailed in any parts and an increase in the power of these parts has been made, the overtime as a rule has been greatly reduced. A striking instance of the amount of regularity so obtained is found in the large works of Messrs. H. Monteith & Co., near Glasgow. In these the dyehouse was enlarged a few years ago to do away with the longer hours, and Mr. D. Crawford, the manager, says "since then I "never remember our working after 6 in the dyehouse," and though the washer's time is rather longer, "they never make any overtime," (No. 145). This is the more noticeable as long hours elsewhere seem to occur more especially in the dyeing department. So again at another and very large printwork the moderate overtime spoken of is attributed by the manager to the printing machine power being in advance of the dyeing and finishing departments, "but shortly these two will be brought "up equal to the rest of the works; we expect that then very little overtime will be necessary," (No. 125). Some additions are said to have been made in view of expected legislation.

Enlargement of works.

221. But though an increase in the amount of work to be done such as to cause much or long continued overtime thus often naturally leads to an increase of the works or their power, as in the words of a manager, "It is the object of a printer to increase machinery so as to save labour and overtime," (No. 60); yet it does not follow that this is always thought desirable or secures its object if it is done. In any case it is not likely that the whole can be done at once, and it is difficult to regulate the increase so as not to throw more work on parts for the time. When an increase is made the amount of business may increase and so require overtime as before, or it may fall off, or the style of the work may change and the increase turn out not to be needed. The risks may be sufficient to discourage any enlargement. Workpeople also taken on in a busy time, it is said, might have to be discharged. The view presents itself to one large employer thus: "A much cheaper and better way of meeting these "difficulties as they arise is by working extra hours, which increases the expense only while there is "actually occasion for it instead of permanently." To secure a sufficient margin to provide for such contingencies without exceeding the usual hours in any part of the work would, it is often said, require an enlargement of establishments involving excessive outlay, of which much would be without any adequate return, or in fact be a loss. A manager describing the increase, first of the printing machines, and then of the dyehouse at a cost of some thousands of pounds, to meet this, says, that the dyehouse from its capacity is not fully occupied generally, and yet that in some styles of work three of the 12 machines would keep the dyehouse fully occupied.

222. Like difficulties, no doubt, occur in enlarging works of other kinds, but probably in few to so great a degree as in printworks in which the variety of processes and styles is so great.

Management of work.

223. Much also will depend on arrangements and management. Amongst other instances of this, the experience of Mr. James M'Adam is much to the point. He mentions that he has studied all the details of the work with the special object of shortening the hours of labour, and to show with what success he has done this in the seven years which he has been manager where he now is, would say that, though it is difficult to compare the average hours now with the former more irregular hours, "it might be taken that about two hours had been saved on the whole," (No. 13). Still, knowing the Factory Acts well, he is decidedly unfavourable to their application to printworks.

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Difference in parts of the trade.

221. These difficulties arising from the great variety and quick changes, do not apply alike to all parts of the trade. Much is of a more staple and permanent kind, and the employment furnished by it more regular. If different classes of business are combined, some may so fit in with others as to make a tolerably even whole. The degree of regularity which can be secured will naturally vary with the styles of business and the goodness of the connexion in different establishments. But it is clear that however varying the nature of the print trade, in some way or other it is found not incompatible with pretty full employment, as shown by the length of the periods found with more or less overtime, and very little, if any, loss of time.

Trade how far regular.

225. The want of employment at certain seasons is likely to be less in proportion as the trade of an establishment is of a varied nature suited for various markets and purposes. A large part of the print trade, amounting, as estimated in the year 1852, to more than three-fourths of the entire production, is for export to different parts of the world. Intervals of trade for one market may thus be filled up by producing for others. "The more a printing establishment is dependent on the home trade, the more "irregular will it be." (No. 26.) Other trades are more or less dependent on season, and some probably more entirely so than the print trade. The print trade must now be regarded as compared with the trades and manufactures of this country generally, and not solely as compared with the cotton manufacture, the only comparison which seems to suggest itself to many. Taking the print trade as a whole, notwithstanding the fluctuations to which it is liable, it does not appear that they necessarily involve loss of time beyond what some other trades are liable to, so far at least as to require exceptional legislation simply on this ground.

Arguments against restrictions; cost.

226. Further restrictions on the employment would, it is said, injure the trade by increasing the cost of production, *i.e.*, of printing, but not of producing the cloth to be printed, which forms usually a large part of the whole price of printed goods as sold. But the proportion borne to this by the cost of printing varies greatly with the kind of goods.

Loss of trade.

227. Such restrictions would also, it is said, by preventing orders being undertaken and executed in so short a time as they can be now, tend to draw away trade from English to foreign printers. (Nos. 16. 17.) It is likely, however, that customers would still go, as they do now, where they find the kind of goods and at the price which suit them best, and to secure getting them in time, if need were, would prefer and in some way manage to make their arrangements a little earlier; nor in other places could they be sure of having an order executed just when they wanted it. Mr. W. C. Wright (No. 17) says that the merchants or customers "with whom we 'producers,' have directly to deal act as "executing orders, buying on commission for clients abroad," in distant countries, and could not accommodate themselves to such arrangements, but must simply meet their clients' wants as they occur. It appears, however, from the statement of Mr. J. L. Gibb made for a different purpose, that as regards the shipping trade which is so important a part, and to which the difficulty referred to seems chiefly to apply, though in some cases "particular patterns" are ordered, and the agent must in such cases either get the goods from a particular house or cancel the order; yet,—

"In the greater number of cases much more licence is given to the agent. The style of the pattern is generally indicated, and the details. He puts the order in the hands of the printer, who suits him as to quality of work, variety of pattern, price, and time of delivery. The last is a most important point; the buyer cannot risk the chance of a fall in value of his goods by remaining long in the hands of the printer, and sudden drops everybody knows have been very frequent of late years. At such times we work as long as we can to get the goods delivered in time." (No. 36) (3.)

228. With the number of houses at one centre to choose from, an order such as referred to might be divided, if it is not so now, for execution by more than one house, in cases where a time named is insisted on and is too short for one house alone. This might be less convenient than dealing with only one, but it would be likely to take less time than seeking out a foreign printer able to take the order, even assuming him to be otherwise equally suitable for the particular purpose. The printer whose goods are thought most suitable for a given purpose will naturally be the one first applied to, and if he asks for more than the time named it may no doubt, if practicable, be given in preference to having to go to another. But if it is the customer's interest to have the goods in a time which can only be secured by working long hours, there is less chance of his allowing further time. Unless the printer takes the order and completes it by working overtime, he may feel that he not only loses this, but runs the more serious risk of losing future orders also, and possibly a connexion which he may never recover. "The difficulty "of recovering a connexion once lost is almost insurmountable."

Injury to small houses.

229. It is also said that further restrictions on the hours of employment would affect most, and might even destroy the smaller printworks, their trade being less wide and more liable to fluctuation, and their power of adapting themselves to meet emergencies less than in the case of the larger works, which would so far gain at the expense of the smaller (Nos. 1, 26, 34.) The disappearance of small works, and the growth of others, seems to have been long going on already. It is further said that the effect of such restrictions so far from being a benefit to the workpeople would really be a loss, taking away the employment of some, and lowering the earnings.

To the workpeople.

Late orders.

230. In some ways probably the difficulties of the print trade have been increased of late years. The quicker means of communication have no doubt allowed of orders being delayed later by customers, who often find this to their advantage, and it is mentioned that the busy times have been thrown later in consequence. "People will not go into things now till they actually want them." A manager remarks that if the hours of labour were limited, it would help to regulate or steady the trade, as customers would have to look before them, whereas now "orders are often taken for delivery by certain "dates, which can only be kept by working long hours. This of course both salesmen and merchants "know and seem to take advantage of."

Variety.

231. The variety also required in prints has greatly increased of late years, involving extra labour and irregularity in the work. It is mentioned of one printwork, which had been known to be kept going for six months on 30 patterns, "now for the same time we must engrave at least 400." By varying the combinations of pattern and colour a very much greater variety of result is produced. For instance, in one style alone, using 250 engraved patterns, it is added, "we have as many as 6,000 varieties."

Saving of labour, &c.

232. On the other hand the increase of machinery and other improvements have allowed of a great

A. saving of time and labour being effected, not merely in the printing, as already referred to (Supr. 56–60, 82–84), but in other parts of the work. As an instance of the degree to which machinery has been applied as a means of saving labour it is mentioned that a mile of calico can be not only printed but passed through the other processes in succession in one unbroken length (No. 26). And again, "fifteen years ago it took 12 men at dash wheels to do what is now done by a washing machine with "one boy. . . . . So in the case of the soaping becks. We should have to work night and day on "the old plan to do what we do now with the improved soaping machinery (No. 49)." Again in the bleaching, an improved method which has only come into general use in printworks in about the last eight years has allowed of shortening two processes from 10, or 12, or 14 hours to five hours or less each (Nos. 80, 120). So in the ageing process, or hanging the cloth after printing, it is mentioned that what 10 or 12 years ago at one large printwork took six or eight days can now be done in 24 hours (No. 143). A saving in the labour of females has also been made of late in other miscellaneous ways, *e.g.*, by sewing machines and plaiting machines now being more generally introduced in warehouse work, &c. With a plaiting machine, it is said, "one girl can do almost as much as three by hooking." (No. 29).

Foreign competition.

233. The main argument to be considered against assimilating the Printworks Act to the Factory Acts, or any approach to such limitations, is the effect which it is feared such restrictions would have on the calico print trade as regards foreign competition. The increase in the cost of production caused by such restrictions would, it is said, make this country unable to compete with foreign printers.

French prints.

234. It is represented that of late the increase in French prints has been such as in part of the trade, and more particularly in this country, to a great extent to displace the English. A letter furnished to me by Mr. Thom (No. 15) contains strong statements as to the increased sale of French prints in this country in the last few years. Inquiries which I made at some wholesale and retail houses in London undoubtedly bear out these statements so far as regards the finer class of prints sold by them. At a leading West-end retail house one of the firm informed me that he did not believe that they had an English print in the house, and that ladies would have French prints. The distinction however thus made between the English and French prints is nothing new in kind. The Mulhouse district has long been known for the excellence of its calico printing, and was described in the year 1852 by a high authority on the English print trade as "certainly the seat of the finest printing in the world."

235. The preference for French prints was commonly accounted for to me by their being more tasteful and better in design, colour, and finish, and so more attractive to those who can afford to pay for them. But to the more numerous classes these qualities are found to be of less importance than more useful qualities and cheapness, and in these the prints of this country have the advantage. Even as to the higher class of prints it seems that of late some of the French kind of work has been taken by our own printers, and a case is referred to in which a wholesale house which a short time ago took only French prints now takes half from a firm in this country. Nor, as appears, does it always follow any more than in the case of other articles that goods bought as French have not been produced in this country. Whatever advantages the French printers may have they seem to be from causes independent of the amount of restrictions on employment in printworks here and not likely to be affected much either way by any probable further restrictions.

236. The French calico printers, however, appear to be the main if not the only important competitors whom our own printers have to meet, except so far as other countries produce for their own use, and the French trade, or the important part of it, is engaged chiefly in prints of the higher quality and price. A large firm of calico, muslin, and delaine printers state that,—

"France is almost the only country which produces goods which come in contact with ours in other parts of the world. We find they do compete with us in the finer class of goods both in home and foreign markets, but in the lower class of goods we cannot say they compete with us at all" (No. 118).

237. The remarks by a high authority, Messrs. W. Crum & Co., as to the competition with the print trade of this country from others, are important, especially as regards France—

"With the French we have to compete in almost every market, for while they are the only European nation which does not import any printed goods, their acknowledged superiority in taste enables the French printers to command the trade in goods of high quality and price consumed by the upper classes of society in this and most other countries. Of late, too, the French printers have turned their attention to the production of commoner goods as well, and they are able to compete with us to a certain extent in many of the markets of Europe and America, into which formerly none but British prints were imported. It is fair at the same time to say that the taste of English manufacturers has so much improved that we now take some share of the trade which was before exclusively done by France" (No. 124).

238. As regards the French calico print trade I was able to obtain some information at Mulhouse, its chief seat, by the kindness of gentlemen in a leading firm there to whom I was introduced, and who also introduced me to another of the largest printing establishments there. The print trade of this district, notwithstanding the high position which it takes, appears to be very limited as compared with the English in the amount of production, judging from the nature of the work and the relatively small number of the persons employed and of the machines, though I am not able to give any statistics as to the quantity or value of the French productions. The general character of the work as described to me is of the kind already pointed out, viz., prints of the higher quality and price, to which attention is given more than to quantity. The print trade of Rouen, another seat of the French printing, is described as comparatively small and chiefly in common kinds of prints not for export.

Character of the English trade.

239. The print trade of this country, excepting the finer and smaller part of it, seems to depend more largely on the advantages of mechanical power, large, quick, and cheap production, and a wide field for consumption, and so far dealing less with a matter of mere luxury to be more easily capable of being conducted with a fair approach to regularity. I am not able to give any comparison brought down to the present time of the extent of the print trade of this country as compared with that of others, but as the latest source of information on the point of which I am aware refer to an authority of which I have already more than once availed myself. In the year 1852 Mr. E. Potter thought that the production of this country might be estimated at 20,000,000 pieces, and that of France, the next to England in value though after the United States in quantity, at 4,500,000, and he was inclined to

think that the production of Great Britain exceeded that of all the rest of the world. Since that time the print trade of this country has greatly increased, and, whatever may have been the increase in that of France or other countries, still unless there have been extraordinary changes, which does not appear to have been the case, it seems that the print trade of this country can be in little danger of being outstripped. A.

240. On the whole, having regard to the working of the present law and the circumstances of the print trade, it appears that considerable modifications of the Printworks Act are required and practicable. It is admitted that overtime, if carried to any extent, is objectionable and unprofitable, and is only practised because it is unavoidable; that with "work in busy times till 9 or 10 p.m. there was less "work done really than with working till 8" (No. 147), and so on. Still overtime to a large extent is made, and probably in many cases will not be found avoidable so long as it is lawful. The manager of a large Scotch printwork insists strongly that some limitation of the hours is necessary for the physical and moral well-being of the work people, and will be a positive benefit to employers, though he thinks the Factory Acts quite inapplicable, and suggests other limitations (No. 117). Alteration of law required.

241. The Amendment of the Printworks Act proposed by the master calico printers in the Lancashire district, as already referred to, is (1) to define "night" as from 8 p.m. to 6 a.m.; (2) to extend the prohibition of night work, which now applies to females and children only, to young persons as defined by the Printworks Act, *i.e.*, so as to include boys from the age of 13 to 16; (3) to prohibit the employment of females and young persons after 2 p.m. on Saturday; and (4), as regards children to adopt a regulation similar to the second regulation of the 6th clause of the Hours of Labour Regulation Bill then before Parliament, in which the employment of children was limited to 6½ hours between 6 a.m. and 8 p.m. It does not propose any fresh provision as to education, but if the labour of children were limited to the above amount there would be no difficulty as to time for school, and I understood that a suitable provision on this point would be approved of. Proposal by masters' committee.

242. Such an amendment would probably be accepted by the majority of masters, though some do not think it practicable to limit the employment to so early an hour as 8 p.m. It would also be a substantial improvement on the present system for the work people, but would still leave them in a very different position from that of work people in factories, in whose position they are anxious to be placed, though, no doubt, as stated by their committee, they would gladly accept any reasonable modifications of the Factory Acts if really required by the necessities of the trade. Under the Act as so amended women and young persons might be employed for a day of 14 hours, except Saturday, without any security for meal times. Such limitations are wider than appear to be necessary or expedient.

243. Some employers think a nearer approach to the Factory Acts practicable. Messrs. A. Orr Ewing admit that the hours now allowed are too long, and would have no objection to their being reduced to a legal day of from 6 a.m. till 7 p.m., with two hours for meals. They also think that children should not be employed so young as 8, and would have no objection to the legal age for their employment being increased to 10, and unless a child can read and write to 13 (No. 142). Different views of employers.

244 It is suggested by others that a day of from 6 a.m. to 6 p.m. with meals might be fixed as the general standard, but with important modifications. For example, Messrs. W. Crum & Co. think that "a very desirable modification of the Factory Act if applied to printworks would be the power of "working during any ten hours between 6 o'clock in the morning and 8 o'clock at night," and that a child on passing an educational test might be employed, *i.e.*, for full time, at 11 years of age instead of at 13 (No. 124). Messrs. H. Monteith & Co. would not object to a day of 12 hours including meal times, with liberty to make overtime on occasion up to two hours a day not oftener than in alternate months (No. 143). Messrs. W. Miller & Son express much the same view, but with rather a different limit to the amount of occasional overtime till 8 p.m., viz., 24 hours in four weeks (No. 147). Or it is thought that part of the work, as the printing or main producing department, but not some subsidiary parts, as the dyeing, might be limited to 6 p.m. (Nos. 49, 94, 139). Mr. F. W. Ashton thinks that 12 hours on five days and six on Saturday, without restrictions as to meals, unless as regards young persons under 16 years of age, might be taken as a basis on which to legislate. This he says would not give his works an average of more than the 60 hours a week of the Factory Act. (No. 26.)

245. Another mode of regulating the hours is suggested as a means of enabling the trade to adapt itself to its varying requirements, viz., that the number of hours should be fixed by the week and not by the day, and that there should be power to recover lost time, *i.e.*, to include time lost by fluctuation in trade within a period of 12 months, it being remarked that in the print trade the power would be valueless if limited to recovery within a period of 6 months. This, unless some further limits were added, would leave separate days entirely unlimited, and allow far greater irregularity than the law as it now stands. Elsewhere a power to recover lost time within six months is suggested (No. 119). Such a power is given under the Bleaching and Dyeing Works Act, and its working has not been such as to make it desirable to follow the precedent. Any provision that could be contrived for allowing recovery of time lost by fluctuation in trade wide enough to be of much practical value to employers as a means of meeting the fluctuations in trade would be open to great objections.

246. A liberty, such as suggested, to make occasional overtime within certain limits would be less objectionable, but still far from satisfactory. No such general power has been conceded to other trades or manufactures, though the Factory Acts Extension Act, 1867, and the Workshop Regulation Act, allow a partial relaxation of the restrictions as to hours in special cases and under prescribed conditions.

247. If it should be decided to reduce the legal hours of employment in printworks the only mode of doing this which can be recommended is to retain the principle of fixed uniform limits whatever those limits may be, including a provision for regular meal times, with such modifications adapted to the nature Uniform hours desirable.

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of the trade as might be thought fit. If this view be adopted the only remaining point is what these limits should be. There does not appear sufficient reason for fixing the standard day in printworks as of greater length than in other trades and manufactures.

Views as to Factory Acts.

248. Messrs. W. Crum & Co., who employ a larger number of persons than are employed in any one printwork in the kingdom, give their opinion thus:—

"Setting aside the effect, which the Legislature will doubtless keep in view, of restrictions on the print trade of this country generally as compared with foreign manufacturers, we have no doubt that, partly by occasional employment of adults and partly by an increase of machinery, our business could be carried on satisfactorily under provisions similar to those of the Factory Acts" (No. 124).

249. So in like manner Mr. E. J. Jones, managing partner of another large firm, Messrs. J. Black, Drew, & Co., employing more than 900 persons, who have no objection in principle to any legislation, but say that the question is as to the practibility, comes to the conclusion:—

"On the whole, if the law applied to the whole country we might probably be able to accommodate ourselves to it without being seriously affected; we should get additional hands, and arrange so as not to lose any time, and work harder when we were pressed. I think, however, that something beyond the factory hours might fairly be allowed to printworks, say an extra hour in the evening in the six winter months" (No. 115).

250. Both of the above are Scotch firms, employing each as many as 300 females and children though very few of the latter, in the manner described as usual in Scotch works, and, except as regards the small number of children, there is nothing in their kind of business to make the factory regulations more easily applicable than in other cases; on the contrary, from the nature of part of the work and the number of females employed, they would apparently be less so than in many printworks.

251. In one or two other cases in the calico print trade or work of the same nature, opinions to something the same effect are expressed; but in one it is said that the dyeing could not be so regulated, and it is suggested that, if overtime is to be worked, it would be desirable to limit it to boys not below 16.

252. These opinions, however, are quite exceptional as regards the calico print trade, and the general opinion of masters is that the Factory Acts would be impracticable, and seriously injure if not ruin the trade.

253. In woollen printing the general opinion is the same, but in one case, where there are but few printers, and the hours are seldom exceeded, the firm say,—"We at present work under the Factory "Act, our works being in the same yard as our woollen works;" and as regards the Factory Acts, "no objection to this (more) than any other trade" (No. 107).

254. At the only tapestry carpet manufactory which I visited, "The hands engaged in printing never "work after the factory hours" (No. 151). The same is the case with the largest house in the trade, as I understand it to be, and very possibly with others.

255. In floorcloth printing there would apparently be little difficulty in conforming to the factory hours (Nos. 109–114).

Experience of Paper-staining Works.

256. The close resemblance of printworks to paper staining works, so far as the printing is concerned, has been already referred to (supr. 90–94), and I had an opportunity of observing it. Indeed, I found a calico printing machine in use for printing paper. Mr. Oram shows the satisfactory working of the Factory Acts Extension Act, 1864, in works of the latter class from the experience of two large firms, and quotes one of Mr. Redgrave's reports as showing from like testimony that the factory hours could without difficulty and with advantage be adopted in calico printing.

Suggestions by Mr. Oram.

257. Mr. Oram's statements and suggestions on the subjects of this inquiry generally will be found of much interest and importance (Nos. 58, 59, 211).

Assimilation to Factory Acts.

258. Should it be thought desirable to assimilate the Printworks Act to the Factory Acts in the main points, certain modifications might properly be made to meet the exigencies of the trade.

Modifications. Young persons.

259. A reduction of the age at which male young persons may be employed as adults would be a great help, and apparently be so regarded, and the least open to objection, towards meeting the requirements of the trade either ordinarily or on emergencies. This might be fixed at the age of 16, as recommended by the masters' committee. This would retain as to males the definition of young persons as in the present Printworks Act.

Dye-house mealtimes.

260. A modification as to mealtimes, similar to that in dyeworks under the Bleaching and Dyeing Works Act, 1860, has been already suggested as regards the dyeing department (sup. 214, 215).

Provision for incomplete process.

261. Having regard to the nature of some of the processes in printworks, it would also probably be a great practical convenience and reasonable to make a modification similar to that in clause 18 of the schedule to the Factory Acts Extension Act, 1867, which in certain works when the process in which a child, young person, or woman is engaged is in an incomplete state at the hour prescribed for ceasing work, allows the employment of such child, young person, or woman, for a period not exceeding thirty minutes beyond the prescribed hour.

Surgical certificates.

262. Great dissatisfaction was expressed to me in Glasgow with the requirements of the Printworks Act as to fees for surgical certificates. The inconvenience complained of would be much lessened by a modification on this point similar to that which the Secretary of State is empowered to permit in certain cases under the Factory Acts Extension Act, 1867 (schedule s. 25 (c), whereby a surgical certificate is not to be invalid solely on account of employment in a factory other than that for which it was granted, if such factory is within the district of the same certifying surgeon.

Assimilation to the Factory Acts.

263. Having regard to all the circumstances, it appears that the Printworks Act may properly be assimilated to the Factory Acts to the extent indicated above. Under such a law printworks would still remain subject to less close restrictions than the great mass of the trades and manufactures of this country.

264. It would be desirable that the new limitations, if made, should take effect gradually, and that a period of some length, as under the Factory Acts Extension Act, 1867, should be allowed before they come into operation to the full extent.

Bleaching, Dyeing, and Finishing Works.

A. Bleaching, &c., Works.

265. It is desirable to point out shortly the several Acts passed relating to Bleaching, Dyeing, and Finishing Works, and their general purport, before referring to the separate details.

The Acts.

266. The first and principal Act is the 23 & 24 Vict. c. 78, intituled "An Act to place the Employment of Women, Young Persons, and Children in Bleaching Works and Dyeing Works under the Regulation of the Factories Act," and called more shortly "The Bleaching and Dyeing Works Act, 1860." The substance of the Act is as follows (pars. 267—274).

Bleaching and Dyeing Works Act, 1860, 23 & 24 Vict. c. 78.

267. It enacts that from the 1st August 1861, the powers and provisions of the Factory Acts recited in it, viz., 3 & 4 Wm. 4., c. 103. 7 & 8 Vict. c. 15. 10 & 11 Vict. c. 29. 13 & 13 Vict. c. 54. 16 & 17 Vict. c. 104. 19 & 20 Vict. c. 38. shall "apply to Bleaching Works and Dyeing Works, except works in which the operation of bleaching by the open-air process is the only operation of bleaching carried on," and to the employment of females, young persons, and children in them, except as therein-after provided. In addition to this exemption of open-air Bleach Works the Act does not apply to Print Works or to Turkey-red Dyeing Works (s. 9.)

Applies the Factory Acts. Exempts certain works.

268. By "Bleaching Works" and "Dyeing Works" in this Act are meant premises employing females, young persons, or children, and in which any process previous to packing is carried on in the occupation of bleaching, dyeing, or finishing yarn or cloth, and steam, water, or other mechanical power is used (s. 7).

Definition of works included.

269. Females above the age of 18 years and young persons may be employed until half-past four on Saturday, and until eight o'clock at night on other days in recovering lost time in every case where their "employment shall have been suspended or time shall have been lost in consequence of fluctuations in trade, the nature of the process, or any other cause." But the whole time for which they have been employed in any one month and the six preceding months must not exceed the total number of hours legal under the Factory Acts, *i.e.*, must not exceed the rate of 60 hours a week for that whole period (s. 2).

Power to recover time lost from any cause.

270. They may not be employed, *i.e.*, exclusive of intervals, for more than nine hours on Saturday, or for more than 12 hours on any other day (s. 3). The hours thus exceptionally allowed for the recovery of lost time, were allowed absolutely during the first 12 months of the working of the Act (s. 1).

Other limitations.

271. When the employment of females or young persons has been suspended in the daytime by loss of water power they may be employed during the day and the night following for as many hours as they might otherwise have been employed, *i.e.*, by day, except on Saturdays, when they may work until six o'clock (s. 4). This differs somewhat from the provision of the Factory Acts applicable to like cases which does not extend to Saturdays and requires notice of the recovery.

Power to recover time lost from want of water power.

272. Every occupier who employs females or young persons after 2·30 p.m. on Saturday, or after 6 p.m. on other days, must every day before noon register in a book approved by the Inspector, and in one of two forms prescribed by the Act, the time they were employed on the previous working day. He may register either the time which each or the longest time which any was employed according as they were employed at different or at nearly the same times (s. 58).

Lost time recovered to be registered.

273. The requirement in s. 28 of the 7 & 8 Vict. c. 15, that notices of lost time intended to be recovered and of time recovered shall be hung up in the entrance of the factory, and s. 33 of the same Act, which provides for the recovery of an hour daily, except on Saturday, of time lost by the interruption of water power, do not apply to the employment of females or young persons under this Act, and the provisions of the Factory Acts as to notice of the time for meals, and as to their being at the same period of the day, do not apply as regards the employment of male persons above 13 years of age in dyeing works (s. 8).

Notices not required.

Exemption as to meal-times in Dye Works.

274. The provisions of the Factories Acts in regard to requiring machinery to be fenced off, and the ceilings of buildings to be whitewashed, and those fixing the times for the meals, do not apply to bleaching works or dyeing works (ss. 10, 12).

Provisions as to machinery, &c. not apply.

275. Open air bleach works, using steam, water, or other mechanical power, were shortly afterwards placed under a separate Act passed in the year 1862, viz., the 25 & 26 Vict. c. 8. intituled, "An Act to prevent the Employment of Women and Children during the Night in certain Operations connected with Bleaching by the Open Air Process." This Act simply provided that in the works defined in it "it shall not be lawful to employ females, young persons, or children, or any of them, during the night, that is to say, from 8 of the clock in the evening to 6 of the clock in the morning, excepting to recover lost time in the manner provided by the Bleaching and Dyeing Works Act:" and that for the enforcement of the Act there shall be applicable the powers, provisions, and penalties of the 7 & 8 Vict. c. 15.

Open-air Bleach Works Act, 1862, 25 & 26 Vict. c. 8.

276. A third Act passed in the year 1863, viz., the 26 & 27 Vict. c. 38., amends the Bleaching and Dyeing Works Act, 1860, by extending it to Calendering and Finishing Works using steam, water, or other mechanical power, the original Act having, as recited in the Amending Act, been intended to include these.

Finishing, &c. Works Act, 1863, 26 & 27 Vict. c. 38.

277. The last special Act is "the Bleaching and Dyeing Works Act Extension Act, 1864," 27 & 28 Vict. c. 98. By this the Bleaching and Dyeing Works Act, 1860, is extended to the employment of women, young persons, and children "in any premises whatever, in the processes of finishing, hooking, or lapping, making-up, and packing any yarn or cloth." The legal number of hours may be worked "either between six in the morning and six in the evening, or seven in the morning and seven in the evening, or eight in the morning and eight in the evening," as the owner may from time to time elect by notice to the Inspector.

Warehouse, &c. Act, 1864, 27 & 28 Vict., c. 98.

Choice of hours.

278. Premises in which all the persons employed are males over the age of 14 years were exempted from this Act.

Places exempted.

279. This Act is not limited like the former Acts to places using steam, water, or other mechanical power, and includes many warehouses, rooms, &c., and is commonly known as the Warehouse Act.

Applies, where no steam power.

280. It is satisfactory to find, as is generally admitted, that the general effect of this legislation, notwithstanding what are considered by some to be great defects, has been decidedly good. It has

Results of this legislation.

A.

conferred great benefits moral and physical on an important class of workpeople, as is gratefull acknowledged by them, without injury to the general trade. Though in the case of some individu establishments the production is said to have been diminished by the restrictions of the Acts, this do not appear to have been the case taking the trade as a whole.

Improved arrangements.

281. This result seems to have been arrived at in a great measure by the greater attention given the mode of conducting the work, so as to meet the altered state of circumstances. Improvements different kinds are described as having taken place of late years in machinery and appliances, and mo particularly in economising time by better arrangement of the work.

"There has been a far more general appreciation of the value of time" (No. 154, &c).

As an instance of this, in the fustian dyeing trade, Mr. J. Schofield thinks that the Act has been benefit.

"It has led to a greater attention being given to economising time, and thus to a greater amount of wo being produced more regularly and in shorter hours, which is clearly a gain to us. We are well satisfi with the law as it stands, and I believe that this is the feeling of employers generally" (No. 199).

Little change else.

Remarks to the same effect are made in other branches. But in other respects there seems to ha been little material change in the general character of the different branches of business either in i mercantile relations or the nature of the processes and employment or in the number of perso employed in the principal districts.

282. No doubt expense and inconvenience, in some cases considerable, have been caused by t restrictions imposed. In the case of one firm it is mentioned that the outlay made simply in order meet the requirements of the Act was 5,000*l*., and that this has not in any way increased the produ tion. But it is reasonable to suppose that in most cases, as remarked by another firm in regard the outlay required in their case, that "the money was not lost. The return comes in another form "the work being more quickly and economically performed, and the return on expenditure is mu "quicker" (No. 227). In some cases no immediate or special outlay for additions was required. B in any case the trade has apparently been able to accommodate itself sufficiently to the requiremen of the law.

Bleaching of foreign cloth.

283. A proof that, notwithstanding the restrictions imposed, bleaching can be performed in th country on favourable terms as compared with others, seems to be given by the fact that large qua tities of foreign cloth are imported unbleached and bleached and finished in Lancashire (Nos. 152, 15 170, 181). This practice seems to have reference specially to cloth from Belgium, which is regarded a principal competitor of England in bleaching, and to be of quite late growth. It is urged, howeve as a proof of the increased competition of foreign countries in manufacturing, and it is said th preparations are being made for doing the work in Belgium, and that any increased restrictions he would be likely to drive the English bleacher out of the market.

Whether Acts sufficiently tried yet.

284. It is, however, considered by some gentlemen that owing to the depressed state of the cotto trade following on the commencement of the American war, which was before the Act of 1860 was complete operation, the working of these Acts, as it would be in a time of full trade, has not yet bee fairly tried. Mr. H. Bridson remarks: "The bleaching trade as a whole is quite equal to producin "under the present conditions what is required of it now, but it probably would not be if the cotto "trade were fully to recover itself" (No. 154). No doubt the Act might have caused more difficult when it first came into full force, but for the diminution at that time in the amount of the cotto manufacture, and it is hard to say where the effects of such a disturbance in trade cease. In th year 1867, however, the imports and weekly consumption of cotton in this country had nearly returne to what they were shortly before the American war, when, viz., in the year 1860, the cotton trade this country "had reached the highest point ever known." The cotton bleaching and dyeing tra would naturally vary in a great degree with the cotton trade generally, though it might be affected b other causes, as the increased proportion of cotton goods exported in an unbleached state. As whether there has been any such increase opposite opinions are given by two gentlemen, Mr. R. Beal and Mr. Crook (Nos. 161, 212). Allowing for all this, however, it seems that there has been sufficie experience of the working of the Acts to admit of a fair judgment being formed, at least as regar the points which are complained of as imperfect.

Recovery of lost time.

285. The chief of these, indeed the only great point at issue as regards works under the Act 1860, is the power of making up time lost "in consequence of fluctuations in trade, the nature of t "process, or any other cause."

Its effect.

286. The extent to which this power is exercised varies greatly in different districts and work Where, as in many cases, it is exercised largely, the practical effect is to make the law substantiall very different from the Factory Acts, and as the cotton factories and bleach works are naturally in th same neighbourhoods the contrast is brought forcibly home to the workpeople.

Mode.

287. The usual mode of recovering lost time under this power in England is by working until 8 p.m with an interval of half an hour for tea, in addition to the usual meals. In Scotland it is not comm when making up lost time to work later than 7.30 p.m., sometimes only an hour is made. If seve and a half hours are thus recovered on the first five days in the week, only an hour and a half can b recovered on Saturday, this making up the limit of 69 hours; but recovery of lost time on Saturda appears to be avoided as far as possible.

288. If much time has been lost it is possible that women and young persons may be employe until 8 p.m. except on Saturday for weeks and months together. Thus, to take an instance given Mr. Redgrave's "Hints on the administration of Bleaching and Dyeing Works Acts," chiefly extracte from one of his half-yearly reports for the practical guidance of employers:—

"If in consequence of fluctuation in trade the employment of women and young persons be reduced fro 60 to 40 hours per week in the months of January and February, the occupier would have lost 160 hour during these two months, and he could recover that time by employing women and young persons for 69 hou per week during the months of March, April, May, and June, and the two first weeks in July, by which ti he would have recovered the 160 hours." (Hints, &c., p. 9.)

289. If the amount of time lost were greater than in the instance above given, or the rate of recovering it less than nine hours per week, time could be legally recovered for a still longer consecutive period. In fact, however, it is not likely to happen that the extreme limit which the law allows should be reached. But work till 8 p.m. for the recovery of lost time is in fact sometimes continued for considerable periods with very little if any interruption. A. Amount.

290. The registers which I examined and statements made to me on the part of employers did not show any case in which such recovery of lost time had been continued for more than three months, though this limit was reached. In one case indeed, that of a large fustian dyeing establishment, it is said "In ordinary years we make up time may be for 15 or 20 weeks together." In most cases, however, the making up is likely to be more or less broken by intervals.

291. Statements were made to me on the part of the workpeople of work until 8 p.m. being continued for much longer periods, but under the circumstances I considered that it was better to treat the case apart from such statements. General statements from memory or common belief, extending back over long periods, would probably weigh little against the evidence of the registers, unless made by large numbers of persons, and more thoroughly sifted than the nature of the case seemed to require or admit of.

292. A feeling also exists that, owing to this power of making up lost time, more time is liable to be and is in some cases worked than is really legal. It is said, however, in the Lancashire district, that there has been only one case of conviction for this, and that this was proved only by the lost time book. But I did not consider it any part of my duty to inquire as to violations of the law, if any, but confined myself simply to the question of the law as it stands and is worked.

293. This of course includes the question whether the law is such as to cause any difficulty in insuring its observance in the case of any persons not disposed to observe it strictly. It is admitted that the present provisions of the law in regard to making up lost time are very defective, and the difficulty is strongly felt by sub-inspectors. However much these provisions might be improved in detail, it appears that any system of making up time on such wide and undefined grounds as now allowed by the Act of 1860 must always be unsatisfactory. The law defective.

294. It would seem a natural construction of the Act that any occupier who wishes to exercise the power of making up lost time given in s. 2. must enter the hours worked every day whatever the amount, as the condition on which alone he can make up lost time. This is often done, and where it is the register shows whether the legal amount of time has been exceeded. But it appears that the law does not require this. The "Lost Time Register" book approved by the inspectors directs that "when "any time is recovered after 6 p.m., or after 2.30 p.m. on Saturdays, the whole time worked by any "female or young person must be entered day by day in the lost time register before 12 o'clock at noon "of the day following the recovery thereof." Thus the register need not show the time worked except for the days on which any is recovered, or how much, or whether any time has been lost. Some registers are kept in this way, the sub-inspector not being able to require more. No doubt private time books are kept, but the production of these cannot be required. A register which may be kept in this way is plainly of very little practical use for the purpose for which it may be presumed that it was intended. Register imperfect.

295. The different parts of the employment being more or less independent and separate, the amount of employment required in each at the same time will often vary, and one part may be busy and recovering time at one time, another at another time. Hence, for the purpose of making up lost time the different persons or sets of persons are treated separately, otherwise the power of recovering lost time would be very much limited. This however makes it more difficult to know how much time is lost or recovered than if the works were treated as a whole.

296. However accurately the register may be kept it is no guide to the workpeople themselves, as they are not entitled to see it. It is said that "the workpeople in general do not know that any such "books are required to be kept." They cannot of course remember accurately for any length of time the amount of time lost or made up. I was indeed informed of a case in which a written account of a great amount of time worked for the recovery of lost time was kept, but I did not happen to meet the persons referred to. It cannot however be expected that the workpeople should keep such an account or would find it of much use if they did keep it.

297. It is suggested by a manager that a debtor and creditor account showing the time lost and the time made up set opposite to one another should be kept. If no lost time could be recovered unless the actual hours worked each day by women and young persons were entered on the following day in the register, and a copy of these entries so far as related to the persons in any one set or room were put up and kept for a certain number of days where it could be seen by those persons, such a provision would probably be sufficient to prevent any risk of neglect or inaccuracy in the register, and would not be unreasonable as a condition for the enjoyment of the privilege. In a case where a sub-inspector, as he told me, being informed that time had been made up on Saturday afternoons for a long period, called and found persons so employed on a Saturday, and after the proper hour on the following Monday found that no entry of the previous Saturday had been made, he was told that the omission was unintentional. Some check on the entries would be useful in such cases. Such an arrangement would also tend to remove any feeling of distrust on the part of the workpeople, which, however ill founded it may be, the present system undoubtedly admits of. Different views also are taken as to what can properly be reckoned as lost time. I am informed that in some cases the legal holidays are so reckoned. As no account of the time lost is required to be kept, what is to be so entered must be a matter of discretion in each case. It would seem desirable that the cause of the loss should be registered as well as the amount, as under the 7 & 8 Vict. c. 15. s. 33. Suggestion.

298. Under the present law, if it is intended to recover lost time at all, an account of the time worked by women and young persons must or ought to be kept at least privately, or it is impossible to know how much, if any, lost time there is to be recovered. Mere memory will hardly be thought a sufficient guide for such a purpose. Such a provision therefore would not involve keeping new accounts, but only the copying of those which exist. Here and there I was told that the workpeople in each room could if they liked see the rough entries kept of their time. Some employers who think it important that the

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present power of making up lost time should be retained, would apparently approve of anything really required to make the law effective and easy to administer. In some cases, whenever it is intended to recover lost time, notice is sent to the sub-inspector, though this is not required by the law. This might reasonably be required. It appears however that any alterations in the law merely directed to this object would give very little satisfaction to the workpeople. Their object is to have the factory hours simply.

Vagueness of Act.

299. The Act of 1860, after applying the Factory Acts to bleaching and dyeing works, except as otherwise provided, and thus prescribing the Factory Acts hours except in the case of making up lost time as already described, contains a provision that for the purposes of the Act, except as otherwise provided in it, "the time within which a person may be employed in bleaching, dyeing, or finishing "works is from 6 o'clock in the morning to 8 o'clock in the evening, but so that such person shall not "work more than 8 hours on Saturday, 12 hours on any other day, nor more than 60 hours in a "week" (s. 11).

Effects.

300. It is hard to see what effect this clause may have, but it seems to contemplate these limits as the ordinary legal limits of employment and not as exceptional. This, with the wide power of making up time, however lost, seems to have led in some cases to an idea that a choice of usual hours somewhat different from the factory hours is allowed. For instance, an employer states, "In my works the "hours of labour are from 6 a.m. to 6 p.m., excepting on Fridays, when business continues till 7 p. m., "and on Saturdays we stop at 1 p.m." In one return the usual hours are given as from 6 a.m. to 7 p.m, but on Monday to 6.30 p.m., on Saturday to 1 p.m. In another, which mentions work as between 6 a.m. and 8 p.m., it is said that there are no usual hours, but it is left to each department to regulate its own hours, which vary according to the nature of the work. The fact also, that though females or young persons are employed after 2 p.m. on Saturday their employment on this day need not be registered unless it is continued after 2.30 p.m. seems to have led to an idea that 2.30 is the legal hour if there are sufficient previous intervals for meals. Mr. Lakeman, sub-inspector of factories at Halifax, writes that as the Act gives employers the opportunity of calling any time lost a suspension of employment within the meaning of the Act, he frequently finds that females come to work at 8 in the morning instead of at 6, and remain till 8 at night, this being called 10½ hours work, *i.e.* besides meal times.

301. It may be doubted if the law intended to sanction any difference from the Factory Act hours except for the purpose of making up time unavoidably lost. But the Act imposes no condition as to the manner in which the time is lost. If an employer closed his works or "suspended the employment" of the females and young persons or any of them on Saturday he could employ those whose employment had been so suspended till 8 o'clock every night but Saturday in the following week, and if this was continued throughout the year it would be hard to show that he was not within the letter of the law. It might possibly in some cases be convenient to avoid the short day on Saturday and make the other days longer, as is spoken of as done sometimes in the case of a printwork referred to.

Extension of hours as a substitute for recovery of lost time.

302. It is suggested by some persons that to avoid the objections to a system of making up lost time and at the same time leave to employers sufficient liberty, which they consider desirable, it would be better to fix a uniform day somewhat longer than the factory day, *e.g.*, to allow work from 6 a.m. till 7 p.m. Such an arrangement would be much simpler and more easy to work than the present, but now that the standard of the factory day has been applied to trades and manufactures generally it seems hardly likely that an extension of the present standard in bleaching and dyeing works would be approved by the Legislature.

303. The president and secretary of the operative Bleachers, Finishers and Dyers Association in the principal English district state that they have considered whether such an arrangement could be accepted by the workpeople as a compromise, and that they do not think it would. They say that if work till 7 p.m. were allowed it would be insisted on whenever there was sufficient work, and that they would prefer things remaining as they are for the present rather than have any change which did not secure for them the factory hours. "We feel assured that this agitation will never cease till the hours are "made equal to the factory hours" (No. 184).

Views of employers.

304. Notwithstanding the general feeling, more particularly in the Lancashire district, against assimilating the Bleaching and Dyeing Works Acts to the Factory Acts, this feeling is not without exception even there. Two masters of bleachworks there expressed themselves to me as decidedly in favour of it, though in one case the gentleman did not wish to state his views except as a matter of conversation, and in the other also I was not enabled to avail myself of the views expressed to me in a definite form.

Recovery of lost time dispensed with.

305. There are a number of cases of different kinds in which the regular hours only are observed, at least as regards all but men. Messrs. R. Ainsworth, a bleaching and dyeing firm of the highest standing, having probably the largest business in England in fine and fancy goods, which are "more "especially subject to variations in demand owing to seasons and other causes," as well as "a large "general business, including most of the kinds of work done by other bleachers," though opposed to the Act of 1860 at the time, have ever since it came into operation observed the strict factory hours for children, young persons, and women, with a trifling exception as to Saturday, rather reducing the amount of actual work (No. 168). In the works of Mr. Bentley, which are amongst the two or three largest, if not the largest, of the general finishing works in Manchester, lost time is never made up, and the same appears to be the case with most of the other works in the same branch of business of Manchester.

306. Some bleachers and dyers are not aware of the power which they have, or have no idea that the liberty which it gives is nearly so wide as it is. Mr. Oram mentions that a member of one of the largest firms in his district was not aware of the power and did not desire it.

Views.

307. Two representatives of the operative Bleachers, Finishers, and Dyers' Association in the Lancashire district say that they have reason to believe that some of the masters would have no objection to the Factory Act, though the majority would like to keep their present liberty. They express their belief, however, that some of the chief grounds of objection to the first Act have now been removed or much lessened, and that the masters will not make any serious resistance to the principle of Factory Act limits, or at any rate any at all equal to the opposition to the former Act.

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Cases of conformity to Factory Acts.

308. Messrs. Ferguson, Brothers, bleachers and dyers, Carlisle, with regard to assimilating the law to the Factory Acts, answer—

"We cannot say it would make any difference. We have a spinning and weaving mill on the same premises, and practically both works are under the same regulations."

The case is the same with Messrs. G. H. Midwood, manufacturers and dyers, though applying to only two workers besides men. In the large works of Messrs. S. Smith, dyers and finishers, Bradford, women and youths never exceed the regular hours.

309. In the Halifax district, where there are three classes of dyers, viz., piece dyers of woollen, pattern dyers of female wearing fabrics, and cotton warp dyers, of 14 works named only six avail themselves of the power of making up time, and there are also several smaller works employing chiefly adults who do not work overtime. Mr. Lakeman, the sub-inspector, says, "Those who do work overtime are engaged "in precisely the same trade as those who do not"; and he can only account for the difference by regularity of system.

In Scotch works.

310. In the Scotch works the recovery of lost time is much less practised than in England, and usually for only a short time continuously, and in several not at all, or only in exceptional cases. One of a deputation of the workpeople did not know of any cases in which time was made up for long periods together, *e. g.* longer than a month or so, nor did the others present. But in an establishment for milling and finishing woollen and mixed goods, nearly all in colours, and most of them woven in colours, which come much in seasons, the manager states that sometimes an hour and a half each day is made up for five or six weeks or two months at a time, though in the last year very little time was lost and was all made up.

Views of employers in Scotch works.

311. The masters are much less opposed to a change to the strict factory limits. Some are decidedly in favour of it. This is the more noticeable, as in Scotland a large part of the trade is in finer goods and more of a fancy nature than in much of the English trade, the Scotch trade being largely in muslin, plain or figured, and in goods coloured in patterns, which seem naturally more liable to fluctuations from seasons and fashions than mere plain useful goods. If work after 6 p.m. became more common, there would no doubt also as a consequence be more time lost in these branches of trade than there now is. In the goods woven in patterns or colours the manufacturers also, as allowed, must be subject to the fluctuations from fashion and season. The proportion also of females is in many cases very large, the stove work being mainly done by them. The work people on the other hand not having to work late so often, some rarely or never, have given less active attention to the matter than in the Lancashire district, and a few expressed their willingness to make overtime, but the great majority wish for the strict factory hours.

312. Messrs. J. Wallace & Co. of Mearns, who employ in their two bleach works 480 persons, of whom 370 are females, and part of whose business is in embroidered muslin, though losing a certain amount of time, but only in the slack season, have never availed themselves of the power of making it up. They seem to have thought that the working of it would be attended with difficulty such as to make it of little practical use. But it is suggested by the manager that in future they may exercise it, but probably only for a night or so at once, and on very rare occasions. The manager, Mr. A. Gordon, says—

"I believe that if work till 7.30 p.m. was continued, after a short time there would be no more work done than in the regular day, at least without great effort and constantly forcing the people to keep up to their work, and to a degree which I should not think right. The work is nearly all hand work, and it would be more difficult to keep them up to the increased amount than if their work depended on machinery" (No. 230).

313. Messrs. J. Young & Sons, bleachers and finishers, employing upwards of 300 persons, nearly seven-eighths of whom are females, and whose business is in light materials, chiefly white and printed muslins, since the American war ended "have entirely given up making up time." They suggest two alterations in the Acts. "First, we think that the clause which allows of making up lost time should "be repealed." The other relates to printworks, which they wish to be brought, with themselves, "strictly under the factory hours" (No. 227).

314. Messrs. J. Cunningham & Sons, bleachers and finishers of muslin, who employ 350 persons, about five-sixths of them females, have made up lost time for an hour on about 40 days in a year, but say—

"We would consider it desirable that all branches of the cotton trade be placed under the Factory Acts. In particular the following divisions of the trade we think should be classed under the same Act, viz., printers, bleachers, dyers, starchers, and finishers, lappers and calenderers, shirt dressers, &c. These operations all dovetail more or less into each other. Besides, workers, both male and female, are changing daily from one trade to another" (No. 231).

315. Messrs. J. and J. Leck, bleachers and finishers, say, in their answers to the printed form—

(1.) "As others work overtime, we have to do the same to supply business orders.

(2.) "The manufacturers, instead of keeping the cloth in their warehouses till the very last, would require to send it more regular, and so cause a steadier trade throughout the year.

(3.) "We hope soon to have an Act to do away with overtime" (No. 236).

316. Messrs. A. Hamilton & Sons, bleachers and finishers, as their manager states, never use the power of making up time except for time lost by breakdowns, *i. e.* of machinery, not liking the people to work overtime except in these cases, and it is never for more than five hours in a week (No. 235). In like manner Messrs. M. Robertson, bleachers and finishers of muslin, employing upwards of 300 persons, five-sixths of them females, only make up time lost by accident, and it seems to have been thought that only time so lost could be made up (No. 237).

317. In a smaller firm, which has lost considerable amounts of time, Mr. Hugh Cochrane still thinks that if all were limited to 6 o'clock it would "be far better and the work more regular." But "while "others work after 6, we must" (No. 241).

318. In some other cases no great importance seems to be attached to the power of making up lost time, and it seems used more for the sake of customers than because it is desired in itself (See, *e. g.*, Nos. 221, 238, 239, 240). Others think it necessary or desirable to keep the Act as it is.

A.

Cause of irregularity. Orders.

319. The great cause of the irregularity in the employment where it exists is, as it was before the Act, the uncertainty of orders, over which the employers have no direct control, though many would prefer regular work. Mr. Ch. Howarth, one of the large bleaching and dyeing firm of Messrs. Thos. Ridgway and Co., in expressing this view, says:—"But the fact is, that goods are kept in the grey till the "merchants get orders, or the markets are in such state as to allow them to operate; then large "quantities are sent in at once to the bleacher and wanted immediately."

Process no obstacle.

320. The nature of the processes, from which much difficulty seems to have been anticipated in conforming to the prescribed hours, seems not to present any real obstacle to regularity of hours, at least any which is not overcome without serious difficulty by arrangement.

Breakdowns.

321. The loss of time from breakdowns of machinery has probably, as was mentioned to me, been lessened by the diminution of wear and tear from long hours, and the greater opportunities afforded of attending to it regularly and keeping it in order.

Recovery of time in night.

322. The power of employing females and young persons at night to recover time lost by want of water power, so far as I could learn, is not known to be exercised now, at least to any extent, probably owing to the small extent to which works now depend on water power.

Meal times.

323. There does not appear any good reason for the provision in section 12 of the Bleaching and Dyeing Works Act, 1860, that the provisions in the Factories Act fixing the times for meals shall not extend to workpeople employed in bleaching works or dyeing works. All young persons and women with the exception referred to as to males over 13 in dyeing works, must still have their meals at the same times of the day to be stated in the notice, and the inconvenience of fixed meal times is thus incurred. The provisions of the Factory Acts that an hour and a half must be allowed for meals between 7·30 a.m. and 6 p.m., as much as an hour of this before 3 p.m., and that no child, young person, or woman can be employed more than five hours before 1 p.m. without an interval of 30 minutes, could not it seems add anything which could reasonably be objected to. Mr. W. S. Darkin, then sub-inspector of factories in Ireland, in the fifth report of the Children's Employment Commission, 1862, p. 195 suggests that if sections 8 and 12 of the Bleaching and Dyeing Works Act, 1860, are held to abrogate all the provisions respecting the times for meals, any new measure should re-enact one of them to secure an interval for meals after four hours of employment, or in some cases a longer interval would probably be adopted by employers.

324. The provision in section 8 of the Bleaching and Dyeing Works Act, 1860, as to the meal times of males over the age of 13 years in dyeing works seems to be suited to the requirements of the trade and it is probably expedient to continue it.

Option of limits under 27 & 28 Vict. c. 98.

325. As regards the option under the Act 27 & 28 Vict. c. 98 of taking the hours of work between 7 a.m. and 7 p.m. or 8 a.m. and 8 p.m., instead of between 6 a.m. and 6 p.m., the fifth report of the Children's Employment Commission, 1862, p. xix., is in favour of continuing such option, having regard to the class of females employed in warehouses and similar employments subject to that Act.

Effect as to recovering lost time.

326. It seems, however, that where the hours are elected to be between 8 a.m. and 8 p.m. the power of making up lost time under sections 2 and 5 of the Bleaching and Dyeing Works Act, 1860, could not according to the terms of that Act be exercised, and not to the full extent when the hours are elected to be from 7 a.m. till 7 p.m.

Fustian cutting, &c., trade how affected by legislation.

327. The employment of fustian cutting is concerned with goods which in the preceding and the following stage of their manufacture form the subject of trades falling under the Bleaching and Dyeing Works Acts, the goods being sent first to the stiffener, then to the cutter, and then to the dyer and finisher. The fustian-dyeing trade being said to be very fluctuating, and to be likely to be injured by restrictions equal to those of the Factory Acts, and as it seemed that the fluctuations must affect the cutters and the dyers equally, as Mr. J. Marchington thinks is the case, I thought it desirable to ascertain how the fustian-cutting trade had been affected by being brought under the Factory Act Extension Act, 1864. On this point Mr. Oram kindly furnished me with ample extracts from one of Mr. Redgrave's half-yearly reports containing statements by some of the principal fustian cutters that the Act had been a great benefit to the trade. Mr. Oram adds that in the course of his inquiries for Mr. Redgrave on the matter amongst the smaller workshops in Manchester, "I found a general feeling "of satisfaction expressed by both masters and journeymen at the beneficial results of the Act in "raising their condition," and gives several statements of fustian cutters bearing this out.

Fustian dyeing.

328. Employers, however, in fustian dyeing and finishing works think that further restrictions on their trade would be injudicious, and Mr. J. Schofield thinks they are more likely than ever to be so now (Nos. 199–202). The fustian dyeing and finishing part of the manufacture is more considerable than the fustian cutting and employs about 3,000 persons, while the latter employs about 2,000.

Places exempt as employing only males over 14 years of age.

No longer so.

329. In Manchester complaint was made of the exemption in the Bleaching and Dyeing Works Act Extension Act 1864 of places employing only males over the age of 14 as unfair to finishing works, and it was said that boys after leaving work in the latter at the prescribed time were sometimes employed till late at night in the exempted places. This exemption, however, of which most of the shipping houses and making up and packing places in Mr. Oram's subdivision availed themselves, has ceased to exist; these places, as I have since learned, being now treated as coming under the Factory Acts Extension Act, 1867, or the Workshop Regulation Act. Mr. Oram's account of these places is left as furnished to me, and particularly as giving a marked instance of how much long hours may depend not on the nature of a trade but on external causes, easily met by arrangement when occasion arises.

Open air bleach works.

330. Open air bleach works, as has been already shown, were exempted from the Bleaching and Dyeing Works Act, 1860, but were placed under a separate Act, 5 & 6 Vict. c. 8., which left them free from any control so far as regarded any employment between 6 a.m. and 8 p.m. I found, however, that these works in the districts in which I began to make inquiry with regard to them were regarded by the inspector and assistant inspector of factories as coming under either the Factory Acts Extension Act 1867, or the Workshops Regulation Act according as they employed 50 or less than 50 persons. Accordingly I did not think it proper to make further inquiry as regards works of this class, though I have

thought that they might come within the exceptions made by those Acts, viz., in the former by s. 5 (3), and in the latter by s. 5. (1). A.

331. One class of works, however, important in size though very few in number, viz., Turkey red dyeing works, are regarded as still free from any regulation. The Bleaching and Dyeing Works Act, 1860, after, in s. 7., defining "bleaching works" and "dyeing works," as shown above, provides in s. 9., as follows:— Turkey red dyeing work

"Nothing in this Act contained shall extend or apply to" (employment in the open air or to premises used solely for the purposes declared in the Printworks Act, or to their occupiers, or to persons employed solely in the manner regulated by that Act), "or to any premises either open, enclosed, or covered, used or to be used *bonâ fide* exclusively for the purposes of carrying on the process, occupation, trade, or business of Turkey red dyeing, or to any employment necessary or incident thereto, or to the occupier of such premises in respect thereof, or to the employment upon such premises of any females, young persons, or children solely engaged or employed in any such process, occupation, trade, business, or employment."

332. The Factory Acts Extension Act, 1867, applies the Factory Acts, with certain modifications, to every factory not excluded from the operation of this Act, and defines "factory" as including besides certain classes of works specially named, "any premises" constituting one trade establishment in which 50 or more persons are employed in any manufacturing process. Amongst the works excluded are (s. 5, par. 3) "any buildings or premises defined to be 'bleaching works' or 'dyeing works'" by the Bleaching and Dyeing Works Act, 1860, or any Acts amending the same. Turkey red dyeing works seem to be regarded as coming within this exception.

333. But having regard to the language of the Bleaching and Dyeing Works Act, 1860, it does not appear how Turkey red dyeing works can be "bleaching works" or "dyeing works" as defined by that Act, nothing in which was to extend or apply to Turkey red dyeing, except of course the words used to show this intention. If they do not come within the exception it seems that where employing 50 or more persons they must come under the operation of the Factory Acts Extension Act, 1867. Turkey red dyeing works, if any, not using steam or water power would not be within the definition of the Act of 1860, and would probably not come within the Act of 1864. Whether exempt.

334. It still less appears how Turkey red dyeing works, if any, employing less than 50 persons can fail to come under the Workshop Regulation Act, in which the only work places excepted besides those under the Bakehouse Regulation Act, 1863, are factories or places subject to the jurisdiction of the inspectors of factories in pursuance of any Act of Parliament then already passed or which should be passed during the then session of Parliament.

335. It seems also that Turkey red dyeing works employing 50 or more persons, not being under the jurisdiction of the inspectors of factories, would come under the Workshop Regulation Act, unless their exemption from the Factory Acts Extension Act, 1867, was held to exempt them altogether from both Acts. If it does so, it might thus still happen that the larger works are left entirely free, while any smaller are subject to restrictions on employment, a result which cannot be supposed to have been contemplated.

336. It may of course have been intended by the Legislature that Turkey red dyeing works should remain exempt from these two Acts of 1867, and that properly construed these Acts do really secure that end. Or it may be that the case of this trade was not in view at the time, and that in any case the intention of the two Acts was to include all trades and manufactures not then regulated by some existing law. I was informed, however, that while the two Acts were in progress it was understood that they would not affect Turkey red dyeing works, and that if they do it would come as a surprise to the persons interested. The view that these works are still exempt being that received and acted on, I make these remarks with great diffidence, but I think it proper to call attention to the point, as it seems to me one of importance. If this trade is meant to be exempt, this should be made more clear than it is, or it might give rise to difficulties any day.

337. Assuming, therefore, that Turkey red dyeing works are still exempt from regulation, their case forms a necessary part of the inquiry as regards any alteration of the Bleaching and Dyeing Works Acts.

338. The general circumstances of the trade as regards the employment and the views entertained with regard to regulating it by law remain much the same as shown in the Report on Bleaching Works in 1855. (See that Report, pp. xxxiv–v., 67–73.) Though the number of the works has increased but little, there has been a considerable increase in the number of persons employed, many of whom in Scotland are females. Further details as to works of this class will be found in Nos. 70–78, 142–150, and 254–255. Circumstance of the trade.

339. Most of the Turkey red dyeing works are in Scotland, where there are, as represented to me, eight Turkey red cloth and three Turkey red yarn dyers, the latter apparently meaning only those who are yarn dyers only. One firm, who are Turkey red cloth dyers, have two separate Turkey red yarn dyeing works, and in at least two other cases I found Turkey red yarn dyeing carried on in the same works as Turkey red cloth dyeing. In England there are three Turkey red cloth dyeing establishments, viz., that of Messrs. F. Steiner, which is of great size, one considerably smaller, and one only very lately started, and I believe but little yarn dyeing. Cloth and ya dyeing.

340. Nearly all the Turkey red cloth dyeing establishments print part of the cloth dyed by them, and in Scotland three carry on general calico printing also. Such works are regarded as coming under regulation only so far as relates to the printing and any processes incidental to it, not part of the usual Turkey red dyeing processes, the department in which the latter are carried on being regarded as separate premises. Messrs. Steiner, however, have always carried on the whole of their business as coming under the Printworks Act, though legally advised that only the printing portion comes under that Act. Messrs. Miller & Higginbotham state that they are under the Printworks Act, but this must mean only as to the printing. Found with printing.

341. Though in general the nature of the Turkey red dyeing business is said to remain the same, it seems that there has been an alteration in one respect, which is of importance with regard to the question The new pro cess.

A.

of any limitation of hours. There are two systems of Turkey red dyeing, one by the old process, in which the goods in the long preparatory processes have to be repeatedly exposed in the open air, and in which this part of the work is greatly lessened and sometimes entirely stopped for some time in the winter; the other by the new process, which is carried on entirely indoors. In 1855 the old process seems to have been that mainly used in the Scotch works, but of late years the new or indoors process has become more general, the advantage being that it is independent of the seasons or weather. This process is said not to be applicable to yarn dyeing or to every kind of cloth goods. But the advantages of it may lead to its being still more generally adopted, and though no doubt there may be some objections to it, of which the cost of certain materials required appears to be one, if means were found of overcoming or lessening these, it might in time supersede the old process. Messrs. H. Monteith reckon that when they have completed their arrangements they will do about half by the old process and half by the new. Messrs. F. Steiner continue to use the new process only, and Messrs. W. Miller & Son also use it only, except for their yarn dyeing, as seems to have been the case at the same works at the former date.

Yarn dyeing.

342. As regards yarn dyeing also Messrs. W. Miller & Son for the last six or eight years "have "exposed the yarn to light and air under a glass roofed shed instead of in the open air," and notwithstanding certain objections which were anticipated, have found this method answer, though there are objections to applying it to cloth dyeing. Mr. T. P. Miller states:—

"This plan makes us independent of the weather and enables us to work within uniform hours. It also saves us keeping an extra staff of hands as we formerly had to do to bring in the yarn in case of a shower, or to put it out again afterwards. I do not know of any other works in which this plan is adopted" (No. 147).

343. Mr. W. Nairn, whose firm have a large Turkey red yarn dyeing establishment, knows of no other instance of such a plan in this country or abroad, and has doubts of its answering, says, "If it "should prove to answer it would be generally adopted, on account of the advantages which it would "give" (No. 255).

344. The yarn dyeing requires more hand labour in proportion than the cloth dyeing, "but other-"wise there is no difference between cloth dyeing on the old process and yarn dyeing."

Hours. Regularity.

345. In the Scotch Turkey red dyeing works the usual hours of work are fully as moderate and regular as they were shown to be formerly, viz. from 6 a.m. till 6 p.m., with two hours for meals. This amount of work is very rarely exceeded, indeed only in exceptional cases, such as delays arising from the state of the weather or other simply accidental causes. The actual work is often, or in some cases as to part of the workers, commonly less. It is occasionally necessary to employ workers at night to guard against fire from the heating of the goods, but this takes place only in a certain stage of the work in the new process and usually "only during summer weather, and even then not frequently." At the works of Messrs. A. Orr Ewing, "with this exception our workers are never employed past 6 o'clock." At those of Messrs. Miller and Higginbotham the hours are never exceeded except in case accident as by stoppage of machinery. At those of Messrs. Stirling these were mentioned as the only causes requiring work of females or boys beyond the hours. At the works of Messrs. H. Monteith in the new process the work is regular from 6 to 6, except on Saturday, and "even in the old or outdoor process the "females never work after 6 now." So at those of Messrs. W. Miller and Son, who use only the new process, there have been some years without requiring to work any extra hours, and at those of Messrs. Fleming, Watson and Nairn with the old process, notwithstanding the weather, "it does not "happen, say, three days in a year that the workers do not leave by 6 p.m."

346. As however the work or important parts of it must be of the same amount every day it is common to begin work before 6 a.m. on Saturday so as to allow of the workers leaving in good time in the afternoon. Messrs. H. Monteith consider it of importance that this should be allowed not only on Saturdays, but occasionally on other days, so as to allow of taking advantage of the weather.

347. It is also said that the nature of the work does not admit of fixed meal times. As regards the actual dyeing the case is the same as in printworks. In the old or outdoor process it may sometimes be necessary to employ workers in the usual meal times on account of the state of the weather, and this in the part of the work done by females.

Regular hours, how far incident to the trade.

348. The regularity in the Scotch Turkey red dyeing works no doubt to some extent arises from the nature of the business, as a more than usual amount of goods begun on one day would involve more than an usual amount of work on many succeeding days, owing to the length of the preparing processes, and so far as the work is dependent on the weather it is no doubt desirable not to have in hand at once more than can be properly completed allowing some margin for the weather, and to keep a sufficient number of workers to ensure this. But when a stock has been prepared, there is nothing in the nature of the work to prevent overtime in the later stages as dyeing or finishing.

Overtime.

349. In Turkey red dyeing works, undertaking an amount of work too great in proportion to the capabilities of the works or any part of them or to the number of the hands, would have the same effect as it has in other works. There seems indeed little likelihood of this in the Scotch works as now conducted.

350. Long hours do in fact prevail in a very large Turkey red dyeing establishment in England, in which only the new process is carried on. Notwithstanding the enlargement of the works to meet the increased requirements of the business, the hours in certain parts are habitually very long, because "these parts are not in proportion to the rest of the works" (No. 70). In one part they are from 4 a.m. till 8.30 p.m., sometimes later, in another from 4 a.m. till 8 p.m. and have been till 8 for five years, in another from 5 a.m. till 7 or 8 p.m., and in the dyehouse from 6 a.m. till 7 or 8 p.m. But Saturday appears to be a short day, and Monday of the stated length. The whole works being conducted under the Printworks Act, the half-time boys in these departments, of whom there are nearly 50 in the dyehouse, do not come till 6 a.m. The making-up girls, of whom 10 are half-timers, as well as those at the finishing stove, have a usual day of 13 hours with meal times.

Conclusion.

351. In the event of any regulations on the principle of the Factory Acts being made for Turkey red dyeing works it seems important that employment should be allowed for as long or nearly as long on

Saturday as on other days, and also out of the usual limits as to meal times or otherwise so far as required to prevent injury to the goods from the state of the weather or heating, and in the dyehouse department with a like provision in regard to meal times as suggested in the case of that department in printworks. Such regulations would effect but little change in the employment in Turkey red dyeing works in Scotland as now conducted, but supposing circumstances to alter, might be more needed, and they would have considerable room for operating now in the other large establishment referred to. A.

352. As the result of the whole it appears that the Bleaching and Dyeing Works Acts require amendment in several points as indicated, and in particular with regard to the very wide power of recovering lost time. The facts seem to show that with regard to bleaching, dyeing and finishing works generally, subject to the slight modifications pointed out, the employment might properly come substantially within the same limits as employment under the Factory Acts under which the class of employment in question has already been placed in form, but with a material difference in practical effect.

353. I much regret the delay which has taken place in the completion of the duty undertaken by me. This arose not from excess in the time occupied in carrying out the actual inquiry, but simply from my inability to place the results earlier before you in a complete form.

I have the honour to be,
Gentlemen,
Your obedient servant,
J. EDWARD WHITE.

PRINTWORKS.

1. *Messrs. E. Potter and Co.*, calico printers, Dinting, Glossop. (*Answers to printed form.)

(1.) Our usual hours of work are exceeded at times, hardly ever in the department wherein printing is carried on, as the progress is regular and may be confined or restricted to certain fixed hours; but in dyeing, finishing, packing, &c. it would be exceedingly inconvenient to be tied down to an absolutely fixed period of labour, as the processes vary so much and are liable to so many minor derangements and disturbances that serious loss would be occasioned by our not being able to make up for irregularities of one sort or another by extra work at times; irregularities the result of accidents or of the ever-varying nature of our trade itself.

(2 and 3.) Any rigid Factory Act would affect the print trade injuriously.

In a cotton factory you may stop the machinery at almost any moment and restrict its working to any duration of time without other effect than the curtailment of production.

In a printworks many of the processes last for two, three, or four hours, and could not be interrupted or curtailed by, say, such a short space of time as five or ten minutes without the goods in operation being entirely spoiled.

Again, many of the processes are consequent one upon the other, and any delay in or interruption of this consequence would be injurious.

A ten hours bill as applied to a printworks as it is in a cotton factory would have a very different meaning; in fact, it would mean in many parts a restriction of work to a much shorter period, seven, eight, or nine hours, or in some cases less. For instance, the printing machine is the main producing agent in a printworks, corresponding more or less to the loom in a cotton factory. Start work at 6 in the morning, the colours used by such machines have to be made immediately previous to that time, as many of them will not keep over night. The colour makers have to commence work therefore an hour earlier in the morning, and naturally leave off an hour earlier in the evening. There are some classes of goods also which having been once dyed must be washed off and finished the same day, as, if allowed to lie for a night in the damp or unclean condition they would be spoiled; consequently the finisher must remain at work (as regards such goods) after the dyer has concluded his labour.

There are many other minor instances of this sort in a printworks.

Again, any fixed and unvarying period for meals would interfere with many of the processes and cause a serious diminution in the amount of production. By the non-observance of a fixed time for meals the worker, in a dychouse more particularly, but also in many other parts of the works, is enabled to get through a very much larger amount of work, profitable both to himself and his employer, without working longer hours or having less real cessation of his labour for his meals, by merely regulating the periods to suit the convenience of his labour.

Labour in a printworks, particularly that of women and children, is by no means so continuous and monotonous as that in a cotton factory. In the latter it is uniform and uninterrupted, except at meal times, from morning till night; in a printworks on the other hand there are many longer and shorter necessary cessations of work from the different processes varying so much in point of time, &c.

That this employment is more attractive is proved by the fact that a printworks obtains for perhaps a less rate of wages for longer nominal hours a superior supply of female labour than a cotton factory can, the longer hours being counterbalanced by less confinement, more variety, and a healthier employment. To adapt a printworks to a Factory Act every department would have to be so enlarged as to embrace or overcome every occasional requirement, and so necessitate a considerable loss of time to the worker and of idle capital and machinery to the employer.

(4.) By the children we suppose half-timers under 13 years of age. We are endeavouring, and have almost succeeded (if not quite), in providing a double supply, so that we may work them alternate days morning and afternoon (that is up to 12 and after 1), giving them the alternate mornings and afternoons for school, and of course alternate Saturdays (when we only work till 1 o'clock) for either work or school. When the labour of children is scarce or attracted elsewhere this course might be somewhat difficult. But in this point we do not think it is one that the employers of labour in the print trade would not wish to overcome. In fact it is more or less a recognized anomaly that we should be allowed to work young children till late hours at nights with a very small modicum of education. The print trade generally would by no means object to the adoption of the system under which *we* are now working (viz., of alternate morning and afternoon work and schooling), with a sufficient or reasonable time allowed for breakfast or tea in each period, but not a compulsory half hour at a certain fixed time, as in a Factory Act, as that would entail a cessation of labour for probably double the time. A satisfactory arrangement on this point would not be difficult.

(5.) As regards the general question.

As far as it concerns the education of young children or the restriction of their hours of labour, we fully admit the desirability of some further legislation. We are aware that there has been some agitation, in the shape of petitions, &c., on the part of the workers employed in the print trade for an application of the Factory Act to printworks; and though it may be perhaps a little out of place, we venture to call attention to the real nature and object of these petitions—not to protect the women and children particularly, but by limiting the hours of labour generally to make it scarce and so increase its value—a trades union theory which has led away many of those who signed the petitions themselves, which was started by men whose position among their fellow labourers is, as regards many of them, more that of professional agitators than that of capable and industrious workers. We fairly acknowledge that since the conclusion of the American war the increased demand which has followed the great reduction in the price of cotton fabrics has caused a considerable amount of overtime in the print trade, advantageous in the long run neither to master nor

* In this and other statements described as "Answers to "printed Form" the numbers (1), &c. refer to the questions as numbered in the circular Form of Inquiries—q. v. in Appendix. —J. E.W.

man, and producing, no doubt, on the part of the worker, a feeling of soreness which has induced a desire for a curtailment of the hours of labour, but that without any diminution of the wages and comforts which have attended such overwork. We feel also that we are justified in calling attention to the important point of foreign competition in our trade. Any legislation, restrictive of, or obstructive to the free employment of labour, however beneficial in the abstract, is undoubtedly a clog and a hindrance and increases the cost of production. The lower rate of wages (lower by 30 to 40 per cent. than ours) in France and Germany is enabling them to undersell us in many classes of goods, both in this our home trade market and in other foreign ones. We would therefore ask, even in the interest of the workers themselves, that any legislation for the benefit of the women and children should be such as to leave the general employment of labour in our trade as untrammelled as possible. There is a point in which, under the present Printworks Act, we stand in a different position to those to whom the Factory Act is applied, namely, in "young persons" becoming adults at 16 instead of 18 as in factories. It would be a matter of serious inconvenience to us if this were altered, and of loss to the workers themselves, as we should in many instances be obliged to substitute adult labour for theirs at an increased cost; and in becoming adults when at 16 instead of 18 such young persons are certainly not in a worse position than their fellow labourers in cotton factories, taking into consideration the healthier and less irksome nature of their labour. In conclusion, the application of the Factory Act to the print trade would probably lead to the destruction of most of the smaller houses in the trade, as being allowed no elasticity they could not adapt themselves to an increased demand in a fluctuating and fancy trade at certain seasons, and their average production would be consequently so much lessened that they would be eaten up by fixed expenses; whereas the larger houses, catering for a larger variety of markets, and therefore less liable to fluctuation in their trade, would suffer less.

It would probably also have this effect in districts where the labour of women and children is cheap and plentiful, as in Scotland and also in some parts of Lancashire: Employers would, for the sake of such cheapness of labour, work under the Act and submit to the loss and inconvenience; in other districts, where the labour of women and children is competed for by the cotton factories, &c., and is consequently dear (and certainly it would be the case with us), they would emancipate themselves from any legislative control whatever by the employment of male adults only, recompensing themselves for the extra cost of the labour by greater freedom in its employment, and consequently a larger production. The consequence would certainly be the reduction of the value of the labour of such women and children, and the substitution of adult labour and machinery in their place."

2. *Thomas Barlow*, foreman of machine printers.—I have been in the trade 35 years, 24 of them here. The general feeling of the men, I believe, is in favour of some change in the law to shorten the hours of labour, but they are not all agreed as to the best way of shortening them. Some are for the Factory Act hours and meal times; some say that there are such difficulties in the way of this in parts of the work. My own view is that a change is required, and would act well. What I think would be best would be a law fixing the hours from 6 a.m. till 6 p.m., with a regular dinner hour, but without any required time for breakfast or tea. These might be taken as convenient.

So far as machine printing is concerned, the machines can be stopped at almost any time without injury to the work. A number of pieces are put on to the machine at once, and we prefer, if we can, to finish what we have on. If necessary, however, we can break them off at the end of any piece. Nothing is spoiled by this, but there is the loss of time from the stopping and making a fresh start.

For short meals, such as breakfast and tea, each printer stops when it is convenient for his work as near as may be at the usual times, viz., 8 a.m. and between 4 and 5 p.m., taking on the average 15 or 20 minutes for each, though all will not be stopping at just the same times. But for dinner, being a longer meal, the machines are all stopped for a full hour, however much work there may be to be done. During this time there is nothing to be done by the boys connected with the machines.

Each machine requires three men, viz., printer, back tenter, and labourer, and a boy, usually a half-timer, who plaits down the pieces as they keep coming off the machine. While the machine is going it is impossible to do without the boy. Besides the plaiters down, there are, say, about half as many odd hands, half-timers, employed in connexion with the machine work.

Our hours in this department are from 6 a.m. till 7 p.m., but on Fridays till 8, so as to leave earlier on Saturdays.

The number of pieces which the machines can do in a given time is according to the kind of work. For some the pieces have to go through the machines oftener than for others. For instance, taking a week's work, perhaps half require to go through only once, and the remainder two or more times.

3. *Riley Riley*, foreman of the dyehouse department.—I have been 30 years in the trade, and 18 years here. My views are much the same as Thomas Barlow's. I agree as to fixing the hours of work from 6 a.m. till 6 p.m., but in the dyehouse we could not stop work at bell hours for meals. The men sit down and eat their meals as their work goes on. Owing to the nature of the work this cannot be avoided. One set cannot as a rule mind the work of others while the latter are taking a meal. There are difficulties in the way of working only from 6 to 6. I see no way now of getting round them. The machines can print more than we can dye in the same hours. If the dyehouse were larger and there were more hands, that would meet this; but then at times some of them would have nothing to do. Men would not like that, but they do not like the long hours. For some weeks now the dyehouse has been working from 5 a.m. till 9 p.m.;* there may be one or two nights sometimes with less. Sometimes we give over at 6. In spring we are slack for a time, and work only from 6 till 6. The work to be done in the dyehouse depends on the kinds which are being printed. Some patterns, as already explained, go through the printing machine only once, and some more times. Some that is printed has not to come into the dyehouse at all. The dyehouse hands are men and boys, the boys being rather more than a third of the whole. The boys are all full timers, the mass of them nearer 18 than 13.

4. *Messrs. J. L. Kennedy & Co.*, printworks, Staleybridge. (Answers to printed form.)

(1.) I consider it unnavoidable on account of the processes being irregular, the demand of the trade exceedingly variable, and the time allowed for the completion of orders very limited.

(2.) I consider it impossible to assimilate the laws by which factory labour and printworks labour can be regulated. The trades are entirely different. The production in a cotton factory is uniform during the year; the article produced is the same, and if the demand does not take off the produce one week it is certain to do so before the month is out. In a printworks there can be very little printing beforehand with safety, as the orders come for special patterns (which are not suited for a general market), and those patterns are many of them engaged to individual merchants, who give such orders and such quantities as the markets may from time to time require.

(3.) In the event of any legislation taking place, I should say the meal times cannot be regulated, as it

* These hours, as explained by Mr. E. C. Potter, are not made by the hands as a whole, but include the whole time of the dyehouse being at work, from the time when the first come till when the last leave.—J. E. W.

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will be impossible to have a set meal hour throughout the works, as many processes could not be stopped. I think it impossible to limit the hours of work of the women within a narrower limit than from 6 a.m. to 9 p.m., though they do not work by any means continuously nearly so many hours during the year.

I consider that for children the hours of labour might be limited to six hours per day, in order that each child employed might attend school either in the morning or afternoon of each day. I think it desirable (if there were proper schools gratuitously provided by the State) that every child or person should be incapable of taking employment before they can read and write and have acquired the rudiments of arithmetic.

5. *Letter from Mr. J. L. Kennedy.* After referring to his report on the Lancashire printworks in 1842, proceeds :—

The main changes in the condition of the workpeople are those observable in all the working people of Lancashire. They are better clothed, better fed, and better housed, and have better wages than they had 20 years ago. Most of the old small printworks are done away with, and their places supplied by well built and well ventilated buildings. The printing with blocks alone has nearly gone out of use, and this has done away with the employment of a large number of children. The hours of work are very much reduced for children and women generally; though they are occasionally employed longish hours, it is not continuous or fatiguing work, and peculiarly suitable to women.

The great point in which I see no improvement is the state of the education of the women and children. [Refers here to the need and importance of this, and to the fact that "25 years have been allowed to pass "by without anything being done."] With more extended education I believe that many of the differences between master and servant would die out, and though combinations for the purpose of raising wages might probably exist, trades union outrages would cease altogether. Depend upon it a really good educational measure would in time work wonders. [Mr. Kennedy apparently refers to a general educational measure, of which he spoke to me. See the above answers, No. 4.—J. E. W.]

6. *Messrs. Thomas Hoyle & Sons,* calico printers, Mayfield and Dukinfield. (From answers to printed form. The work carried on at the Dukinfield works is "bleaching, dyeing, and finishing processes incident "to calico printing, the remaining processes being "carried on at Mayfield, Manchester." The two employ 650 persons.—J. E. W.)

(1.) We consider the excess unavoidable, as the trade is one of seasons, and we can only work in anticipation within very narrow limits.

(2.) We think the limitations of the Factory Acts would seriously affect us, both for the above stated reason and by reason of the continuity of some of our processses.

(3.) We are unable to suggest any modification of the Factory Acts. We think any legislation should be on the basis of the existing Printworks Act.

7. *The Strines Printing Co.,* near Stockport. (From answers to printed form. Nearly 500 persons employed.—J. E. W.)

(1.) The excess is unavoidable owing to change of seasons and fashion, and consequent great fluctuations in demand. If patterns never changed and styles remained the same, like the production of a cotton mill, then the hours might be assimilated to the Factory Act, except as to meal hours in the dyehouses (madder dyehouse and fancy dyehouse at these works, J. E. W.), in which under no circumstances could the engine be stopped for meals.

(3.) To allow the dyehouses to work continuously without stopping for meals, and to allow women and children to work until 8 o'clock at night during the busy seasons.

(5.) If printworks were placed under the present Factory Act the men employed would suffer considerably, as they would be unable to work overtime during the busy seasons to make up for the time lost during the slack times, in consequence of the Factory Act not permitting females and young persons to work overtime, and men on printworks not being able to manage the processes of printing without the assistance of females and young persons.

8. *Mr. J. Thom* (Messrs. M'Naughtan and Thom, calico printers, Birkacre, Chorley). Suggestions for a "Printworks Short Time Act."

A certain number of hours per week, not day by day. Stoppage for meals not to be compulsory, *i.e.*, the machinery may run from 6 a.m. until the day be finished, the workpeople stopping at what time may be most convenient for themselves or employers. That a period of 12 months be allowed for working up lost time, and that the year begin in April or May. Six months would be valueless, as the winter and spring months are always busy, and the summer and autumn months slack.

Short timers to be as they are, and young persons to be as they are, except in as far as the new Act may shorten the length of the legal day.

The dyehouse must at all events be continuously worked.

9. *James Bamber,* foreman dyer.—I have been 28 years in dyehouse work. (*Describes hours worked formerly.*) The dyehouse used generally to run longer than any other part. I cannot tell how it was that we managed to do with shorter hours afterwards, except it was on account of the law.

We reckon the day now from 6 a.m. to 6 p.m. The actual hours are not the same in all parts of the dyehouse, and they are longer or shorter according as we are busy or not. The dyehouse has different departments for different processes, some of them carried on in separate buildings, and some are rather later than the others. The pieces which are begun must be completed so far that they can be left till next day without spoiling. The processes also and the time required for them are different, according to the different kinds of goods which are being dyed.

The actual dyeing is done in cisterns called dyebecks. The dyer's work is to fasten the pieces to the machinery and to watch them constantly, so as to put them right whenever there is occasion. If this process were interrupted the goods would be spoiled. If the machinery breaks down the winches must be worked by hand till the dyeing is completed. As soon as one set of pieces is completed another is put on immediately so as to lose no time.

The same man or set of men can attend to more than one dyebeck. Thus, here three men attend to four dyebecks, another man to two, and so on. Where two dyebecks are worked together, the second cannot be started till a quarter of an hour or so after the first, and where there are four worked together the last will be nearly an hour behind the first. It is not possible for the dyers to leave their work at any time till the whole is completed. Consequently they can have no regular meal times, but take their food as they watch their work. They are therefore paid as working all the time, and can thus complete their day of 10 hours by 4 o'clock.

Four rounds or sets of pieces put through the dyebecks is a regular day's work. After these are completed, about half an hour or so more is required for the washing. If the dyebecks are properly attended to the four rounds can be completed by about 5 o'clock, and the washers and all the other dyehouse hands can clear out by 6 o'clock.

To make five full rounds takes at least three more hours, and we work then till what we call 10 p.m., or really 9.30 by the clock. I always work according to what we have got to do, and when we are busy we generally work till what we call 8 or 10 p.m., though these are really only 7.30 and 9.30 by the clock. The men rather like working overtime. Lately, however, we have not been busy.

The other processes are all much shorter, and allow of stopping at almost any time. The boys are all

employed in these departments or work connected with them, and have half an hour at 8 for breakfast and the same for dinner at 12 regularly by the bell. But they could not stop longer than half an hour at dinner or they would get too much behind the dyers, and the things would get spoiled. No boys under 18 are employed at the dyebecks or so mixed up with them as to be unable to have their regular meal times.

In the dyehouse department altogether there are 52 men, and about 20 boys under the age of 18, and three of them under 13, but they are of no use at all here under 12. The boys begin from 6*s.* a week, at about 14 they get to 8*s.*, at 15 or 16 to 13*s.*, and at 17 or 18 begin to expect the wages of men, *i.e.*, 15*s.*

It is my opinion that, for the reasons which I have given, we cannot have the 10 hours bill for the dyehouse, but we want a 12 hours bill, *i.e.*, to work between 6 a.m. and 6 p.m. without being obliged to stop for the factory meal times. It was said that some dyers were of opinion that they could work the 10 hours bill in a dyehouse. I did not believe that we could, and was picked out by the men here to go to the meeting at Manchester and object to it. I did so, but there was a great majority against me. However, at that meeting I was the only dyer present, and of all the 26 or 27 men there were not a quarter who really understood the dyehouse work or could give an explanation about it. (*Added through Mr Thom.*) James Bamber * * * has been foreman dyer at Birkacre 16 years past, and never worked after 10 at night during that time.

10. *Thomas Hope*, foreman of machine printers.—In this department there are 15 boys under 13 years of age, about 10 more under 18, and 40 men.

Our regular hours are to work from 6 a.m. till 6 p.m., and play the bell hours, *i.e.*, meal times. There is no difficulty in stopping the work for these. When we are busy we work the dinner hour and on till 7 p.m., which makes a day and two hours. This is for about two months in the year. We very seldom work any longer hours. If we do we make a day and three hours.

11. *Levi Walker*, foreman finisher. — In these rooms there are 30 girls and women, and 10 men and boys, none of the latter under about 15 years old. Of the females, half are under the age of 15, and four half-timers.

The work is as follows :—The pieces of print come in wet from the dyehouse. They are then plaited or folded by children, but this will be done away with by means of machinery. They are then dried on hot cylinders, then starched by machines, and afterwards calendered, and lastly packed up.

The hours are called from 6 a.m. till 6 p.m., with full meal times, but we more commonly work the meal times, taking half an hour for dinner, and stop work at 5. But for three or four months in the year we work long hours, and for two or three of these months till 9.30 p.m., and sometimes 10. This is most in the winter. Our hours on the average are from 6 a.m. till 7.30 or 8 p.m. When we work late a tea half hour is taken. The half-timers stay after 6, but usually not quite so late as the others, though if we are very busy they do.

It is important in the case of some pieces that they should be dried at once as soon as they come in, or else the colours would run and spoil the pattern. That is one reason why some of us do not want any interference about meal hours. If an Act were passed under which we had to stop a certain time for meals, it would have a bad effect in this way, and hinder the later stages of the work in the case of all but six of the hands.

The idea which has been suggested of fixing a limit of so many hours in a week, leaving the hours for each day as at present, had not occurred to us. The universal feeling is for having no work after 6 o'clock. Late work gives no opportunity for education.

12. *Robert Lee*, foreman of the white room.—There are about 30 girls and women in this room, about half of them under the age of 15, and only about four over that of 18 ; five are short-timers. The youngest girls work at the drying machines, the next at the hooking machines, and the elder sort and tie up.

Our proper hours are from 6 a.m. till 6 p.m., with half an hour for breakfast at 8.30, and an hour for dinner at 1. But as a general rule for about half the year we are very busy and work longer, but not more than two or three months at a time. Now we are working till 8.30 p.m. It should be 9, but I allow them the half hour off because they only stop a few minutes for breakfast. When we are busy we very seldom stop the breakfast half hour. At dinner they stop only half an hour when busy, and are paid as if working the whole hour. If there were more girls we could not get the work done any sooner, unless there were more machines also ; the machines which we have at present could not do it. I do not find the girls tired at night. I think they like working by gaslight better. They are more at liberty, and they get the overtime money. Their wages, without overtime, are from 4*s.* 6*d.* to 7*s.* a week.

I send the short-timers home at 6 o'clock and fill their places with elder girls whose work depends on the printing machines, and who can therefore be spared as soon as the printing machines stop, which is usually in good time.

The short-timers go to school for their six weeks at one time. Some of them like school best, some do not. All of them can read, I know.

13. *James Richardson*, foreman of the stitching room.—There are 19 girls and women in this room, all from 14 or 15 years old upwards. Their wages are, on the average, 7*s.* a week.

The proper hours are from 6 a.m. till 6 p.m., with half an hour for breakfast at 9, and an hour for dinner at 1. When we are busy, which is usually for about five months in the year, chiefly in winter, we work till what we call 7, 8, 9, or 10 p.m., *i.e.*, really stopping half an hour before these hours ; when we are busy it is more often till 9.30 than any other time. Sometimes they work right up till 10 by the clock. They like working the short time, *i.e.*, till only 6, the best.

14. *Remarks by Mr. Thom* (on Nos. 9–13).

We allow the dyers 20 minutes out of the place. Four rounds cannot, I should say, be completed by 5 o'clock and all the hands away by 6. I never saw it actually done with four rounds. We pay for work till 7. When the dyehouse works till 9.30 p.m., many of the hands are gone earlier. The wages named for the dyehouse are the nominal wages, for inferior hands. The wages taken are much more. The upper hands get high wages.

The overtime in the machine room is usually for more than two months in the year, but that is correct, speaking of times of late. Stopping for meals would lose time if we were busy. They are told what they have to get through, and they do it as they please.

The numbers in the finishing room are much greater now than at the time spoken of, because we are busier. The change spoken of in the plaiting is now made, the pieces come up from the dyehouse and plait themselves down.

As to the wages mentioned for the stitching room, the payment is by the piece, and greatly in excess of the apparent wages.

15. *Mr. Thom* referred me on the subject of competition from French printers to the following letter addressed to him by an agent of his firm in London, with a note to it by himself, viz.,—

London, April 6, 1867.

Below I hand you a list of the French printers who have houses or agencies in London (*five named*). These five houses have until the last two or three years sold direct to the retail shops, but latterly they have sold to the wholesale houses also. The sale of French prints has very rapidly increased during the last four or five years, in fact ever since the American

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war. There has been five or six times the quantity sold in England during the last three years than in previous years. I attribute this to two causes, one is that the price of our goods rose so high as practically to bring the cost to the consumer nearly as much as the French goods, or at any rate to diminish the difference very considerably. Thus when our 72 reed goods were selling at 11*s.* 6*d.* the piece, or 5¼*d.* per yard, in 1861, the average price of French percales was 11½*d.* the metre. In 1865, when our 72 cloth was 19*s.* 6*d.*, or 9*d.* per yard, the price for the French percales was 12½*d.* per metre only.

Another reason is that the taste of the consumers *in towns* is getting more and more into the French styles.

Before 1864 I do not know a single wholesale house who bought a piece of French print. I now give you the names of those who buy regularly in their general print department. Those marked * send their buyers to Mulhouse (*twelve named, six being marked* *). Until within the last three years you would not see French prints except in the west end houses, but now you see them in almost every quarter of London, amongst shops who do a general trade, and also in all the provincial towns. Until within the last few years for instance, in Manchester the French agent would call only on such shops as (*two named*), but now you will find French prints in the hands of every small draper, and French shirtings in the windows of every hosier and outfitter.

One great cause of the increased sale of French prints is their attention to minutiæ in finishing and making up new goods. They do not pay half as much attention to fastness of colour or excellence of cloth as they do to the make up of their goods to please the eye of the purchaser. This goes on to the retailer who knows that one half his sales are made from his window.

If you have time to visit London, I should like to walk with you through the thoroughfares, and you will see for yourself what a very general sale there is here for French goods.

Note to the above by Mr. Thom. Mem. The finishing is overrated here. The writer had some goods finished exactly as the French and could not get a farthing a piece more for them. The French are beating the English not by minutiæ of finishing. The lower price of coals has affected the French printers very much, and as they have our markets as well as their own, and we have not theirs, their general expenses are very much reduced.

16. *Messrs. Wood and Wright*, calico printers, Bank Bridge and Clayton Vale. (From answers to printed form. Some way upwards of 600 persons employed.—J.E.W.)

(1.) Excess in the usual hours of labour is occasionally for a short time unavoidable from the rise of a sudden demand. This demand (and it is almost at all times irregular) must be instantly met to enable the merchant to take advantage of the then present state of the market. The excess very rarely occurs in all departments simultaneously, but in one or two, from their being exceptionally unable to keep pace with the others. This may arise from the styles of work in hand at the moment, some taking longer to get through in one department, some in the next. In a printworks the amount of capital sunk in "plant" is necessarily, under any circumstances, very large (in copper rollers alone, for instance, some 18,000*l.*), an outlay which must, under the present existing difficulties, be very fully worked to be productive. We need not say that for the printer to enlarge his works to meet with certainty and without overtime any exceptional demand, or so that no one department should any time be driven to excess, would be impossible. The place for many months in the year would be half standing, the mere interest on the outlay lost, the men half employed, for in such case they must be retained, since skilled labour could not be procured at any moment when required.

(2.) As above, in printing the processes are so complicated, so irregular, and yet so dependent on one another, that they cannot all be submitted to the same rule without such crippling as would ruin the business. Scarcely two styles, and the number is innumerable, go through the same departments and in the same time. *With many the process must be completed before stopping or the goods are at once* absolutely destroyed, as in the dyehouses, and occasionally almost in each department. *To limit the hours arbitrarily, as in the Factory Acts, would be simply entirely to destroy the trade. It could no longer be carried on.*

(3.) From the nature of the business any legislation could only be very exceptional. It would be essential to recognize the above difficulties, the *necessary* excess, the irregularity, &c. &c. The Factory Acts, if applied, would require almost an entire remodelling.

(4.) Nine to twelve; one to four.

(5.) We regard legislation which shall restrict the hours of labour, and so necessarily, as above, cripple the business, as very dangerous. It would in part, and might wholly in fact, destroy the print trade. We are unwilling to speak of the very great existing difficulties arising from its nature, of the enormous outlay required in machinery and plant, and of the small margin of profit now left on such outlay—a margin so small in many cases that any further limitation would destroy it, as for instance, any legislation that should injure the trade, however indirectly.

The demand, as stated above, and the nature of the work, *must* always be irregular, and if the printer here is unable from restrictive measures to produce the work in the given time, the merchant *must*, in self defence, procure it elsewhere, *i.e.*, from the foreign printer, to enable him to compete with others already so obtaining it. It is unnecessary to say that thus the trade would be irreparably injured, for the difficulty of recovering a connexion once lost is all but insurmountable. A repetition of the order in the same quarter must follow, *i.e.*, to the foreign printer, even when there is no such *immediate* demand, an *exact* repetition being probably required by the client abroad, the same patterns and exact style of work. Other matters of detail increase the difficulty. The printer abroad finds himself able to supply the demand for other markets also, and will almost at once absorb the merchant's entire business. The occasional excess in the hours of labour is however for all interests never greater than can by possibility be avoided, such excess being, if *continued*, disproportionate in result, unprofitable, leading to bad and careless work, &c. In the case of one or two departments only working the necessary overtime it is still more manifestly bad in the interest of the master, the steam having to be kept up and the engines work- for these only. It would therefore always *be preferred* to increase the means of production as far as this could be done, and such increase is almost always taking place, *but this* (*as above stated*) *can be done only to a certain extent. These safeguards of interest alone are sufficient to prevent any excess in the hours of labour but such as is absolutely unavoidable*, and such *occasional* excess *must ever* in a printworks be *absolutely unavoidable.*

17. *Mr. W. C. Wright* (in answer to questions arising on the above, whether he thought that the irregularity of demand "must from the nature of the "case always remain as great as it is at present," and would not be lessened under an altered state of circumstances, and asking for any reasons which he might be able to give) writes thus :—

As regards the irregularity of demand which all printers are liable to, and for which you have doubtless had many reasons given, I do not see any *likely source* of remedy. The merchants or customers you speak of, and with whom we printers, "producers," have directly to deal, act as executing orders, "buy- "ing" on commission for clients abroad, and it would lie in the hands of such client to act out a remedy. But such clients are usually placed in countries far too remote to be able to enter into any schemes of

benefit to the producer as to curtailment of hours of labour, and the therefore necessity of ordering their wants and requirements accordingly, and it would simply be out of their power, as their own wants are constantly varying from seasons, stock on hand, internal wars, and perhaps as sudden peacemakings, and many other causes, *e.g.*, Mexico, where the demand has been of the most intermittent description lately, and for some time past; and such wants as they occur and *when* they *occur* must be promptly met, and they will go where they can be so met, if not in England, to France, Belgium, Germany, all eager competitors, and now very close competitors too. The English producer would be the sufferer, and an important branch of trade pass into other channels. I think the competition with foreign producers should never be lost sight of; and prices and qualities from *such* close competition are now so *equalized* that quick execution and dispatch would turn the scale in favour of the one who could best meet such demands. * * * *

18. *John Parsons*, foreman of block printers.—Block printers have a rule of their own to work only from 6 a.m. to 6 p.m.; they have had this rule I think about two years. Formerly they used to work here up to 8 or 9 o'clock. I have not found any difficulty from the change. Taken at the long run there is as much work done now as there was before. When men work overtime much they get a feeling of fatigue. They have worked more steadily since. If all would work steadily from 6 a.m. to 6 p.m. I should be quite content. As a general body block printers have much improved in steadiness of late years. I have been here 12 years; we get along very well with them here.

Some do work beyond 6 at times, but it is only exceptional. In a case of necessity, to oblige us, some work, say, till 8 p.m., but this would be only a few at once. Or a man who has not finished his piece by 6 o'clock may stay to finish it if it is necessary.

They stop regularly for meal times also. With most sorts a piece can be left unfinished for as much as an hour, but not for a night. An average piece will take a man, say, two hours. If a man was ready to begin a fresh piece at, say, 4 o'clock, and had only a very long piece, which would keep him long after 6, to go on with, he would leave off altogether for that day.

I have to make my calculations and arrange the work for them so as to make the pieces fit in to the proper times, and so that they can get through them with as little loss of time as possible. If I were not to arrange so that work is ready for them when they are ready for it they would often have to be waiting doing nothing.

There are 160 block printers here, but only about 44 teerers are wanted for them, and eight or nine spare children. They are boys and girls, and all half-timers, at 3*s.* a week. They are sent to school each for two half days per week as nearly as may be.

19. *William Rogers*, machine printer.—Our proper hours are from 6 a.m. till 6 p.m. We work overtime for, I should say, about four months in the year; till 7.30 p.m. is the most common time then, sometimes it is 8.30. We worked about this amount last year. I have been here 28 years. Some few years ago before the cotton famine we used to work till 9 and 10 p.m. generally, as well as very often in the dinner hour. We did not give over at 6 o'clock a month in the year, I should say. There are more machines now. When we stay, the lads stay. They have not heavy work. They plait down and only come to help us at odd times.

The machines all stop at fixed times both for breakfast and dinner, or as nearly as we can arrange it. I am stopping now just at 12. We do not like stopping if we can help it in the middle of a roll, as we lose time in starting again. We generally arrange to avoid this. If only two or three pieces are left on the roll at the time, we run these out. If there are a great many on, we break off at the end of a piece. A roll may have from 10 to 50 pieces. We can run nearly a piece a minute, or say 50 in an hour, at quick speed. When we work overtime we stop for tea just as is most convenient.

Each time that the machine stops there are several things to do, such as changing the colours, taking the rollers out, whetting the doctor, &c. These take perhaps half an hour on the average, sometimes an hour. If I finished a roll say at 11.30, I should go on getting all these things ready by 12, so as to start again exactly at 1. With small orders, such as tens, we lose more time by having to stop so often. Sometimes we can put two small orders on together.

20. *John Welsh*, foreman madder dyer.—There are about 50 hands altogether in this dyehouse, about 20 of them boys, and four or five of them half-timers, down perhaps to 9 or 10 years old; I never take any younger. The boys are chiefly engaged in the washing part.

The dyehouse process takes a long time and cannot be interrupted. The hands take their meals as they can manage. Each set of pieces is in the dye vats on the average from two and a half to three hours; half an hour more is wanted for putting them in and taking them out, and at least an hour more for washing them. All sorts must be washed immediately after they come out from the dyeing. I have let some lie for the night without, but have found bad results from it. Sometimes also things occur that delay us half an hour or an hour.

We begin in the morning at 6 o'clock, never before, and work according to what there is to be done. When we are busy we go, say, 15 hours; when we are slack, say nine, or from that to 12 hours. I have only been here three years. In the first nine months there was very little overtime. Then for a year there was a great deal. There was scarcely any part of it in which we did not make overtime. The first six months of the past year were busy. On the whole I may say that in this part of the work we are busy so as to make overtime for nine months of the year.

As a rule we never go after 10 o'clock. We find it does not answer. But I have seen us working after 10 some or other of the nights for a month together. It would not be for more than, say, a couple of nights together at once. When we have worked after 10 I have never omitted to send away the boys under 16 years old. I make that a standing rule. It is not on account of the law, but because it would not be right to keep them after that time. I am aware that there is an Act of Parliament prohibiting boys under a certain age from working after 10, and there are boards put up about it. In such a case we stop part of the place and take the older hands from that to put on in the other in place of the boys. I have many times worked day and night both, from 6 o'clock in the morning of one day, through the night and on through the next day up till 8 and 10 o'clock at night without stopping; but all the boys under 16 were sent away at 10. I cannot say how many times I have done that. It was just as it was wanted. I never worked longer than that, and I do not like that at all. You must attend to the work all the time.

21. *John Bardsley*, foreman blue dyer.—I have been foreman dyer 40 years, 37 of them here. I never could see that we could manage to play the bell hours. The hands take their meals when they please.

The work is this: The pieces are hooked on frames by boys, and the frames then dipped in the dye vats by men several times, after which the pieces are taken off the frames and bowled or swilled on rollers by men, and then are ready to leave the dyehouse. Each frame has to be lifted out every few minutes, and after being left out a few minutes dipped again, and has to pass through a set of vats. This dipping and taking out must go on regularly, to oxidise the indigo properly and make the cloth blue; but the process gets longer as the day goes on. A frame can be finished in the morning in an hour and a half, but at the end of the day takes, say, three hours and a half, on account of the indigo getting oxidised.

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There are two men and one boy as hooker to each set of vats, and some boys who plait down, making altogether 12 boys in this room, some of them half-timers. A frame carries 60 yards, or two pieces, and can be hooked in ten minutes; but a boy must hook a frame to be ready whenever it is wanted. That is why this boy is hooking now, 12.30, though the others are sitting down taking their dinner. The boys who plait down could stop at a regular time.

The day's work is from 6 a.m. till 4.30 p.m., and till 1 p.m. on Saturday. They make overtime for an hour sometimes, it may be for two or three hours; I have known it five hours, but not for some time past.

22. *Richard Pendlebury*, in the bleach house.—I am assistant foreman here. We begin work at 6 a.m. and leave off generally at 6 or 7 p.m.; very seldom later than 7, and then at 8 or 9. We cannot stop at regular intervals for meals; we may be running a pile off or putting one down, and must wait to finish it. From the time when we begin a pile till when we can stop takes perhaps, one with another, an hour and three-quarters. We take, however, half an hour for breakfast, and when we are busy the same for dinner, or when we are slack an hour.

23. *John Thomas Lawson*, age 10.—I work in the stove, plaiting pieces. I come in the morning at 6, and give over in the evening sometimes at 6, most nights at 7 or 8, sometimes at later, up to 9 and 9.30. I have an hour for dinner, and take it here in the stove.

24. *Mr. Bardsley*, timekeeper and under manager. —All parts in both the two works begin at 6 a.m., but otherwise the actual hours worked usually differ more or less in different parts. In the dyeing itself there are no regular meal times. In the dunging or cleansing house, however, which forms part of the dyeing department, the boys have meals at fixed hours, half an hour for breakfast and an hour for dinner. This process, which fixes the mordant and takes out the thickening which has been used in printing, comes before the dyeing, and it is necessary for enough to be got ready for the dyers to go on with. To allow of the dyers beginning at the proper time next morning, these boys have very often to work till 9 or 10 p.m. They are from 13 to 18 years old.

In the drying there are a number of younger boys who plait up by hand, which is the old way, instead of its being done by the spiral or new way, in which the cloth is drawn up by machinery. The spiral drying pulls the cloth too much out of the square to suit for block printing, so we do it all by hand for block printing. The drying is the busiest part of our work, because a great deal more work comes out of the dyehouse than the driers can get through in their regular hours. To stop this part of the work early would delay the whole of the works.

The goods for block printing are hung up in stoves to dry (after dyeing), and for this purpose are plaited in folds by young boys, of whom there are 12 in the two stoves. The temperature of the stoves is about 100°; I tried by the thermometer one day and found it 98°. This is a different part of the work from the drying described above.

The finishing part, too, must often work late. Some kinds of work must be dried at once after they are dyed, or they would be spoiled. Some dyes will wait all night without hurting, but several shades will not. Perhaps a third part of what we do will not wait. There are some women and boys in this part. They work when busy till 7, 8, or 9 p.m.; sometimes, but very rarely, till 10. The makers-up work much like the finishers. In the making-up room there are 14 girls between the ages, say, of 11 and 14 or 15. For two nights in the last fortnight they all stayed till 8.30, but that is the latest that they have been for a long time. They have their meal times regularly, except occasionally when they work in the dinner hour to get an order off to Manchester.

If we wanted to work at night I should send off all the boys under 16 and the women, and put men in the place of the boys. It is a great disadvantage to have to put a man at 15*s.* a week in the place of a boy who gets only 3*s.* 6*d.*

25. *Mr. Wright* remarked on the above statements (Nos. 18–24) to the following effect, viz.:—

On No. 21. The boys who plait down in the blue dyehouse could not stop at a regular time, as stated.

On No. 23. The boys in the stove will not work as stated. "Most nights" should be "most nights, when working after 6."

On No. 24. It must be very occasional for the boys at the cleansing process to work till 9 or 10, as stated. As a rule this stops before the dyeing, and is very seldom after 6. The spiral drying is used except for cloth for block printing. The whole of the cloth used throughout the works has to go over the drying machines spoken of, both in the drying after bleaching and in the drying before finishing, and the work of the drying machines is regulated by the amount coming out from the croft or the dyehouse. The actual finishing very seldom works late. (Mr. Wright remarked on certain other points as in his opinion not correctly stated, but afterwards wrote that on inquiry he found the statements correct.)

26. *Mr. F. W. Ashton* (Messrs. F. W. Ashton & Co., printworks, Newton Bank).—Printing cannot be carried on with the same regularity as manufacturing. Any machine used in spinning and manufacturing cotton may be stopped at any moment without injury to or waste of materials in process, and may be started again instantaneously at the point at which it was stopped. In nearly all the processes connected with calico printing this is not the case; a certain amount of preparation is required before either commencing an operation or discontinuing it.

If you take the printing machine, for example, you must of necessity finish printing the piece or you spoil it, and it is at least desirable that the printer finish the roll of pieces actually in process before stopping. Consequently it is always an object with him to arrange his work so that he is not caught with a number of pieces to print at any appointed time for leaving off work. It will be easily conceived from this that if you increase the number of stoppages, for meal times, &c., you give increased opportunities of losing time. The loss of time in stopping is comparatively nothing to the loss of time in starting again. Colours required to be warm have gone cold; others have dried on the roller; others have acted on the doctors. The machine itself is not merely started by turning a handle, but to some extent requires re-adjusting. To sum up, it may take any time, from ten minutes to in many cases more than half an hour, to get a machine going again, from to all intents and purposes the point at which it was stopped. Besides loss of time, there is loss of material. Again, if you take the operations in the dyehouse; many processes here require a certain time for their development which cannot by any possibility be curtailed or made to tally with any regulated working hours; the operations must be more or less continuous throughout the day. These do not involve continuous labour, but they do require the presence of workmen to "tent" them. The actual labour they do necessitate occurs at long intervals, so that there is ample opportunity for the men employed in them to get their meals, but on the spot. No regular meal times at which all employed in this department must leave it at the same time would be practicable. Nevertheless, there are ample opportunities for all to get their meals comfortably and at proper intervals.

Owing to the varied nature of the work required at different times, and other circumstances, pressure is thrown now on some parts of the works and now on others.

Goods cannot be produced to stock in the same way as in manufacturing. It is well known that the further an article is from the raw material the greater is the risk of its production. This is especially the case with prints. They are produced in different styles and patterns for different markets and seasons,

and their value depends on their being completed in time. There are certain kinds of patterns which, if not sold one year, will sell much the same the next year. These are staple styles requiring the least amount of skill in their production, the least dependent upon change of fashion, such as were sold 20 years ago and will sell 20 years hence. But in the other kinds the great variety which we have to produce is extraordinary. The trade has very much altered in this respect in the last few years. I have known these works kept going for six months on 30 patterns. Now for the same time we must engrave at least 400. A great number of varieties are produced with the same patterns. In one style, *i.e.*, class of prints arranged and shown together as having a distinctive feature in common, for which we have say 250 engraved patterns, we have as many as 6,000 varieties.

The variations of trade are greater for some works than for others. The more a printing establishment is dependent on the home trade, the more irregular will it be. Formerly these works were employed almost entirely for the home trade. Now we have other styles of work, so as to fill up as far as we can the intervals in the home trade. We are still, however, unequally employed. Speaking roughly, we are four months in the year very busy, in December and January, June and July, four months very slack, and four months average. These seasons recur with us very regularly.

What we have been striving to do is to make 8 o'clock our limit of work when we are busy. That I believe may be done with good management. The machine room and the dyehouse seldom work beyond 8. This last season the machine room has worked perhaps eight or nine days till 9. The work in the bleaching department depends in some degree on the course of the grey cloth market. If the price of cloth fluctuates it is liable to make the bleaching irregular. We were very busy there at the end of last year. In one week the boys in the bleaching croft made what counted as nine days in the week, and worked some days 15 and 16 hours. The 16 hours would be made from 6 a.m. till 10 p.m., with working the meal times. There would be time allowed to all for meals in turn, but not one regular meal time. Please bear in mind that when the labour is continuous, as in the "machine room," we always stop one hour in the middle of the day, when all hands there employed are allowed to leave the works. But in almost all other processes, bleaching, dyeing, &c., the labour is not what I call continuous; it is spasmodic, and dependent upon the completion of certain operations (chemical in their nature); consequently there are long intervals of rest. Again these intervals do not come at the same time for all hands, but for different lots at different times. Therefore all have in turn ample time for meals.

In the finishing department, about the same time, part of the hands worked till 10 for about three or four weeks. Some females and boys might occasionally. All women's work in this department is piece work. The last two or three years, however, are not a proper guide as to the ordinary state of the print trade and the hours.

This irregular working may be considered as accidental and exceptional, but as you have referred to it, I will take the opportunity it gives me of stating that work is very often irregular in different parts of the same works, arising from circumstances which are altogether beyond the control of those having the management of them. Owing to orders running upon styles which are got through some departments quicker than others, you may have great pressure in some parts of the works and not much to do in others. Now with a 10 hours bill as a maximum time for working all through, it would be very frequently necessary to work portions of the establishment six and eight hours. As it is we have the opportunity of taking the reverse action and working those parts that are behind 12 and 14 hours per day. You might say in reply to this, why not increase the department that is behindhand? My answer would be, "that any department so much behindhand to-day, "may next month or next week have nothing to do."

If we were not allowed to work after 6 o'clock we should have to extend the works, and this would require a great outlay. Machinery is already used as a means of saving labour to a wonderful degree. We could print a piece of calico a mile long without a break in it, and could pass it through all the processes in succession in one unbroken length, but not without stopping. There would be many stoppages in its progress and long intervals between different processes. Extension of works would not meet the case unless our trade had gradually extended with it, and then only very partially.

I am quite prepared myself to submit cheerfully to some greater restriction of our working hours than at present in force, should such be the result of the present inquiry, and I think that 12 hours per day, or 66 hours per week (12 hours for five days and six hours for Saturday), without any restrictions as to meal times, unless such restriction be limited to young persons under 16 years of age, might be taken as a basis on which to legislate, if you must needs legislate at all. This for the 12 months at our works would not give us an average of more than the 60 hours per week of the Factory Act.

Any restriction as to time of working will be in favour of large works as against small works, from the fact that the smaller are more affected by seasons than the larger; their range of customers or trade is not so wide. Our own works are on an average scale. My experience of the trade is that small concerns work longer hours in busy times and shorter hours in slack times than large concerns. There may be difference of opinion as to the reason for this, but I do not think the fact will be disputed.

(*From letter with the above.*) You ask me in your letter of 4th inst. if I have had personal experience of the Factory Acts. I have never had the management of a factory, but have had more or less to do with cotton mills, as owner, &c., for years past.

27. *Mr. Joseph Taylor*, manager.—The finishing and making up are often an hour later than the dyehouse. It need not be so if there were more machinery, though it might be necessary in cases even then. Certain kinds of work must be dried the same day as they are dyed. We therefore arrange to take these early in the day as far as possible. If a great deal of the work were of this kind it would make a difficulty; but it seldom happens here that any large proportion of the work is so at one time.

In the finishing department some boys plait up by hand. This could be done by machinery in all cases, even when the cloth is to be used for block printing. Block printers often do not think so, but we do. It does not hurt the cloth for their work; but the custom has been to do it by hand, and they do not like it altered to the other way.

In the making up room, where the girls and young women are all on piece work, the women frequently do not come in the morning till 7 o'clock, and stay away more than the regular time for meals. The young girls are hookers; they are, say, from 14 to 16 years old.

28. *Mr. James Allen.*—I manage the dyehouse department. We could not work the dyehouse under the Factory Act. We could work it between 6 a.m. and 8 p.m. With that we should not average more than 10 hours a day taking the year round.

The hours have been much shortened in the time that I have been here; that is nearly 10 years. This has been done by improving the machinery, giving attention to the work, and arranging the orders carefully. In the busiest times now we seldom exceed 8 p.m. here. After the dyeing is done about an hour is wanted to finish up the washing, but I include this.

The boys have half an hour for meals three times a day. The washing machinery stops, and nearly

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always about the usual meal times, say within five or ten minutes. The boys, about eight, are all over 13 years. We do not like the half-timers.

29. *Mr. Thomas Bennett* (Mr. J. Bennett's, calico printer, Birch Vale.)—I and my brother manage these works for our father. At the beginning of this year we employed about 650 persons, about our usual number on an average, though last summer we paid wages to upwards of 800 in one pay. This is, I believe, the largest block printing business in the trade. When we are busy we have 300 blockers, 60 of whom are women; but these, I believe, are the only works, except one, in which women in any number are so employed. The reason of our having such a large number of block printers is that our trade is chiefly in rich and expensive chintzes supplied to eastern markets, and block printing is more suitable for this kind of work. The work we do, wanted for Persia, must be blocked and fast colours. Chintz means a print with more than five colours. We have machines which will print eight colours, and we used to do a good deal of work in which a large number of colours were put in by the machine. These when done by the machine were loose colours, and the people abroad, probably finding this, seem to prefer what will wash.

In the trade generally there has been more block printing the last three years than there has been for 15 years or so. There has been more demand for blocking styles since the American war. The stocks abroad had got low during that time, which partly accounts for the increase, as well as the fashion or taste of the people preferring the block work. The fashion may alter any day.

The block printers work from 6 a.m. till 6 p.m. Some of them work at times in two shifts, one from 6 o'clock to 4, and the next shift from 4 till 10 o'clock. This only occurs when we are short of work. None of those who employ teerers do so. It is only an arrangement which we make when work is slack, to enable us to keep the men employed. There are only about 100 teerers wanted for the 300 block printers, their place being supplied in the greater number of cases by an apparatus called a toby tub. Very few block printers work in the dinner hour. I consider there are not more than 12 men who work during that time. These children are from 8 years old up to 13.

The block printers are in most cases dependent on the printing machines, which print the earlier colours on the cloth. We print a few pieces by block alone; not many. Our chintzes are seven colours; four are printed by machines, and then dyed and blocked afterwards, blue, green, and yellow, or any fancy colours required. In order to keep the blockers going we are now keeping the machine printing room going till 9 p.m. We began this on the first of this month, January, and shall continue it perhaps three months; this will depend on the demand. If we stopped the machine printing room at 6 o'clock we could not print enough to keep all the blockers going. The machines never run at night. We should never run them later than 9 p.m., except in a very urgent case. In the machine printing room there are women to sew the pieces, and there are 11 boys, half-timers, who plait down, one for each machine, in the room above, where the pieces are dried as they pass up from the machines.

When we are very busy we work the dyehouse through the night by having two sets of hands. We did so for about three months last year. There are very few boys there; including the wash-house only about four under 16, and three or four more under 18. The drying part must be half an hour or an hour later than the dyehouse. If we had to stop the girls at the drying and the women who sew pieces early, we could not keep nearly so many hands employed. The pieces in the madder dyehouse will not be injured by waiting of being dried; but the reason we work half an hour or an hour later in the drying part is to keep straight with the dyehouse. If we did not do so there would be an accumulation of pieces wanting to be dried. Blocked pieces in the wash-house would be injured if left part washed, or if they were not dried after being washed. After the pieces are blocked they may safely wait till next day before being washed. There is a separate wash-house for the block printed pieces. After these are put into the washing machine, which is necessary to get out the thickening of the colours and cause them to be bright, they cannot be left till they are dried, because the block printed colours are loose and would come off on to other parts of the piece. From the time when one of these pieces is put into the washing machine till the time when it is dried is an hour and a half.

The blue dyehouse begins at 6 a.m., perhaps 5 sometimes, and leaves off at 3 p.m. Boys hook the pieces on frames and turn rollers for washing them out. The frames have to be dipped in the vats every few minutes by the men, and boys must hook frames whenever they are wanted, so the hands work their meal hours there. The boys could not hook enough beforehand so as to leave at meal times, because the frames cannot be used till they are dry after being used, or the moisture would make the colour run. It takes about a quarter of an hour to dry the frames. Twelve frames are used to each set of vats. The number of blue vats to a set is ten, so that the two spare frames are drying and being filled again with pieces to be dipped. Having more spare frames would make no difference, for the boys are fully employed with hooking the spare frames to keep the vats going. They could not hook a lot in advance. The boys do not hook much during the dinner hour, for nearly all the pieces are hooked before then; but when they are not hooking they assist the men to renew the vats by bringing lime, &c.

A number of girls work at the drying machines. Some sew pieces together, and the youngest plait up with the hand. For block printing this must be done by the hand. To do it by machine would pull the cloth too much. We think the cloth is straighter plaited by the hand, and does better for blocking. Plaiting machines will do where there is no blocking.

In the making up room the girls are full timers. We are busy in this part as much as anywhere, because it is the last work before the goods are sent off, except the packing, which is done in the same room. Generally, however, the last cart leaves at 8 p.m., because the last train leaves at 10, and it takes an hour and a half to get to it, and it is no use working here after that cart is gone. In special cases, however, *e.g.*, to get goods ready for a shipping order, we send a special cart all the way to Manchester. In such cases the girls stay here hooking till 9, 9.30, or 9.45 p.m. The packers, who are men, stay later, perhaps till 11 or 12, as on account of the tolls the cart does not start before midnight. If the goods were not sent in time for that ship it would be longer before we should get a repeated order, and then the hands would suffer as well as we.

Instead of hooking by hand a plaiting machine can be used. We put down one a year ago, and finding it work well have ordered two more. One girl with this can do about as much as three by hooking.

When trade is slack we work perhaps only till 4 p.m., and sometimes do not begin till 8 a.m., and do nothing on Saturday.

The hands are paid once a fortnight. That is, I believe, the general custom of the trade, though I believe there are a few who pay weekly.

The half-timers are sent to school for their six weeks at a time if they can be spared; or if not, make up their attendance at other times as they can be spared.

The general effect of a law requiring us to stop work at 6 o'clock would be, as seems to me, to diminish greatly the amount of work which we can do when we are busy, as well as the number of hands whom we employ. I have not worked out any calculation, but probably where we now turn out 10,000 pieces we then could not turn out more than 7,000, and instead of employing 800 hands we could only employ 600.

If we stopped at 6 o'clock, I believe it would make the difference you have written both as to number of hands and pieces. It would also cause about 200*l.* each pay day less to be paid for wages, which would affect this neighbourhood. I calculate that we employ 200 more hands and print 3,000 pieces weekly more by working after 6 o'clock p.m. when we are busy.

If we were under the Factory Act and stopped at 6 o'clock, we could not print the orders and do the trade which is required. In that case the consequence would be, the merchants would probably buy and get their goods printed in foreign markets, which would do great harm to the printing trade in England, and this country would suffer.

[In the above certain alterations are embodied from the answers written to further questions on it as originally written or as revised.—J. E. W.]

30. *John Ash*, machine printer.—I thought that this Factory Act which came in this year included printworks as far as women and children are concerned; I should like it to. We should like the work more regular if it could be so. If it cannot, and if such a law would be likely to take away part of the trade, and the wages too, of course we must be content as we are. But I look at it in this light, and I think that most of us here look at in the same, viz., that the work must be done, and that by taking some from the overtime, more would be put into the daytime. Of course all would prefer that. No doubt this is only opinion. The masters may have another opinion, and may see things which we cannot. I have heard of the work-people in printworks trying to get a Ten Hours Bill, but know little about it here.

If the boys could not work after, say, 6 o'clock, and work was wanted later, we should have to get some one else older to put in a boy's place. The boys who work with us here are half-timers. They are suitable for the work. There is nothing heavy or laborious in it. They don't appear to be tired, not even when we are working till 9 o'clock at night. That may be the case for two months together perhaps, it is just for bits of pushes. It is 35 years since I began in the trade. If you were to ask others here you would, I think, find their opinion much the same as mine. I think you are as near the truth now as you can go. A great many cry out for the Ten Hours Bill.

31. *Abel Lomax*, block printer.—We don't work after 6 o'clock. We stop then, though we are in the middle of a piece except it happens to be a piece which we could not leave unfinished without hurting it. Some pieces are so, but when we have any of that sort, we generally scheme it so that we can have done it by 5 o'clock, so as to allow plenty of time to be sure of finishing it. If we get behindhand with work of this kind, we can work the bell hours to make up. We can do this without keeping the child to teer, but teer for ourselves. We do many a table so, *i.e.*, the length of cloth spread on the table at once, or about seven feet. If we have not done in time for the teerers to wash up the things by 6 o'clock, we send them away and wash up ourselves.

This girl (Mary Newsham, aged 8), teers for me. She has just come back from school. She has been making up her time there. Some make it in six weeks, some take longer to do it, because they don't attend regularly.

32. *Abraham Taylor*, bleacher.—We begin work at 6 a.m. and leave off at different times, sometimes before 6, as early 5 or 4 o'clock, but generally about 8, and sometimes at 9 or 10. In a time of full work we are, say, about half of the time at work till 9 or 10. Wednesday, Thursday, and Friday are long days usually. We stop for breakfast and dinner, but not for tea. Sometimes on Saturday we begin at 4 a.m. and work with men till the boys come at 6 a.m. There are seven boys in here, four of them half-timers.

33. *Ann Bennett*, aged 12, plaiter up by hand for the drying machine. There are four girls and a boy besides me at the same work in this room. I was 10 when I came here. I have had 11*s.* in a fortnight; that was with overtime. We come at 6 in the morning. The time that we leave in the evening depends on when the dyers give over. Sometimes we go away at 7, 8, or 9 o'clock. The latest that I have been here was 10 minutes to 10.

34. *The Kinder Printing Co.*, calico printers, Kinder, Derbyshire.

A.—We are decidedly in favour of any regulations whereby a sufficient education can be secured to the children of the working classes, and should be glad to promote and support any regulations by which that may be secured, but at the same time we consider that bringing calico printers under the same regulations as the cotton manufacturers would not answer the purpose, and would be highly injurious to our trade and render it almost impossible for us to meet the competition we have to contend with in foreign markets caused by the free trade legislation of the last few years.

In a cotton factory the hours of labour can commence and stop at a fixed hour without injury to the goods being manufactured, but this is not so in the calico printing and dyeing trade. Many operations for chemical reasons have to be carefully watched during the process, and cannot be stopped till that process is completed. Any arbitrary stoppage, therefore, would cause in many instances the destruction of the goods.

Also the print trade is essentially a season's trade and if for any reason goods are produced too late for shipment to the markets for which they are intended, they are thrown on the printer's hands and are almost unsaleable. Orders are always given by the merchants for shipment by a particular mode of conveyance, and if by any restriction we could not produce the goods in time the result would be the transference of the orders to our foreign competitors to the direct injury of the employed as well as the employers. It would also tend very materially to enhance the cost to the home consumer. We also fear that that any undue restriction in the hours of labour of women and young people (we are not speaking of small children) would be very injurious to our workpeople, as it would tend to break up and disperse families as we should be compelled in many instances to discharge girls and boys and employ adult labour instead. This would be highly distasteful to the working classes themselves when they discovered how the thing would work. For instance we have in our employ many entire families, viz., father, sons, and daughters, who live under the same roof, and any legislation that would compel us to discharge the sons and daughters would in many instances banish them from the paternal roof, and if they lived in a country place, such as where our works are situate, they would be driven unprotected to some neighbouring town in search of work, the result of which, in the case of females particularly, would require no stretch of imagination to conceive.

The calico printing business (different to many others) is a most healthy occupation, being principally carried on in country places and in large and well ventilated rooms, without continuous and exhausting labour, and ample time allowed for meals, &c., and the trade being already under the operation of a special Act we consider that further legislation would be superfluous. In conclusion we add the remarks (B.) of our working manager Mr. Gibb, in which he gives his view of the subject for your consideration.

B. *Our manager's report.*—Any further restrictions upon the hours of labour of young persons or grown up females would be most inconvenient to us without any commensurate benefit to them. The printing trade is very different to spinning or weaving; you cannot anticipate the taste, and if your goods are too late they are almost unsaleable. We have sometimes to run the machines late to get our samples forwarded in time, and sometimes to get our goods forward so as to prevent the order for them being cancelled. This difficulty applies more to smaller concerns such as ours than to concerns which have from 20 to 25 machines. We have 12, and the tendency of any

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arrangement which would tie us down to particular hours would be to throw the trade into the hands of these houses, which could start a much larger number of machines upon an order than we could. (See No. 36. (3) J. E. W.) We can only meet a push as to time by running our machines a little longer. It may be said, Why not put down more machines? Many printers have done so, but the exigencies of the trade have kept pace with the extension of the machines, so that we really do not turn out more goods now with 12 than we at one time did with 8. (See No. 36. (2.) J. E. W.) All printers have felt this, arising from various causes, more especially from the demand for variety.

The inability occasionally to run to the time allowed by the Printworks Act would be most injurious to us. Many of our orders are taken on condition of being executed within a very short period, and with all our efforts we sometimes fail in getting them off before the last day allowed for them. Any further restriction upon the time of the females and young persons employed in finishing, working, (hooking?) and making up would in such cases be very much felt. If we refuse to be tied to time the orders would be given to the more extensive houses. If an order gets cancelled the goods have not a standard value, but have generally to be sold at a great loss.

In the dyeing processes we cannot possibly stop at particular times, inasmuch as goods put in the dye at 5 o'clock are not safe till towards 8 o'clock. This precludes the possibility of our being put on same footing as a weaving or spinning factory, where they can stop or start momentarily without damage.

We see no benefit in any change to the females or young persons themselves. (See No. 36. (1.) J. E. W.) The tendency of restrictions would be to throw them out of their present employment and separate them from their relatives, most of whom are also employed here. It cannot be said that they are overworked, and restrictions must at least reduce their wages.

35. *Additional statement by Mr. J. L. Gibb.*—I have had 30 years' experience in printworks, and have been manager here ever since these works were built, *i.e.*, about 14 years. I believe that the general feeling round here is that any further restrictions would tend to throw females and children out of employment in printworks, their place being taken by machinery.

The "pushes" are the great difficulty of the trade. On one occasion a large quantity of cloth was wanted on very short notice, and it would have been a loss of several thousand pounds to us if we could not have done it in time. We could only accomplish this by employing night relays of hands, but we sent away of course all the females and children, keeping the boys over 13 years of age. This was done for several weeks, and was the only occasion on which we attempted to use a general relay of hands. Night work is not advantageous in this trade. Experienced hands cannot be got on short notice. A great deal was lost by the night work of which I have spoken, though on the whole a much larger amount was saved, or of course we should not have adopted it. (*See remark* (4) *below.*)

The finishing, making up, and packing departments work to about the same time on the average. Sometimes to finish and send off goods for a particular order we run till 9 or nearly 10 p.m., but only upon very particular occasions, and the goods are then sent off in carts some miles for the night train. It is very seldom that these departments work much later than 8 p.m., though at present they are very often working till 9.

At the machine printing the men stop and go out when the bell rings for dinner. If you were to go in there five minutes after 12 you would not see a man working. At the breakfast and tea half hours we try to get them to run to the end of their rolls before stopping, but they prefer stopping at the time, and generally arrange so as to get to the end of their rolls by then. (*See remark* (5) *below.*) The boys who plait down for the machines are all over 13; they have little to do but watch. If a boy were looking about him and a piece slacked back, as it is called, perhaps a couple of pieces would be spoiled and a delay of half an hour or more caused; so they cannot be spared while the machines are going.

The children are sent to school generally each for a week at a time, sometimes two weeks, when they can be best spared. If they are wanted they come back to work before the end of the week. There is the greatest difficulty to get the parents to send their children to school; they complain and almost threaten to take their children away from us because they are sent to school. It is necessary that there should be education, but mere shortening of hours of work would not secure this without compulsion to attend school and examination as to the amount of education obtained. (*See the remark* (6) *below.*)

36. *Further remarks by Mr. J. L. Gibb.*—(Remarks (1.), (2.), and (3.) are in answer to a letter asking questions on certain points referred to above in No. 34 B. The passages referred to in these and the remaining remarks are shown by the references given in No. 34 B. and 35 q.v. J. E. W.)

(1.) So far as females are concerned I believe it would be less favourable to morality. They are employed here, on the average, to about 8 o'clock. The work is very light. If at liberty many of them would probably be worse employed, and losing money instead of making it. To illustrate, it is almost an unknown occurrence here for a female to have an illegitimate child. It is known to be very different in many of the factories where the girls have so much spare time upon their hands upon an evening. This place is not an isolated instance; to me the inference is a simple one.

(2.) The reason of more machines being now required than formerly to print the same quantity of goods is, that there is a demand for much greater variety of pattern. Where a buyer at one time ordered 50 pieces to a pattern he often now orders as low as five. In printing there is often more time occupied in changing the rollers upon which the patterns are engraved and the colours for printing than in the actual printing of the pieces. The change took place during the time of the cotton famine; goods were high in price, and buyers bought a much smaller number with as great variety as possible. The demand for variety, once started, has continued, and evidently will continue. The printer gets no remuneration of any kind for the extra cost.

(3.) A large portion of the shipping trade is done through agents here (as sample, I may mention A. and S. Henry and Co.). In some cases *particular patterns* are ordered, and in such instances they must either get the goods from a particular house or cancel the order. But in the greater number of cases much more licence is given to the agent. The *style* of pattern is generally indicated, and the details left to the agent. He puts the order in the hands of the printer who suits him as to *quality of work, variety of pattern, price, and time of delivery.* The last is a most important point; the buyer cannot risk the chance of a fall in value of his goods by remaining long in the hands of the printer, and sudden drops everybody knows have been very frequent of late years. At such times we work as long as we can to get the goods delivered in time. If this were not in our power we would require to decline the order, which would fall into the hands of some house which could put a much greater number of machines upon a particular order. In this way the tendency of restrictions as to time would be *to throw the trade into the hands of the larger houses at the expense of the smaller.* If the goods are behind time they are often thrown upon our hands, *especially when there is a fall in the value of cloth*, and it must be remembered that these goods are not like cloth, generally saleable, being often printed for particular markets.

(4.) In this case trade had been good for some time and prices steady. We had large orders on hand, which under ordinary circumstances would have been

delivered soon enough to save cancelling, but a very sudden and great drop at once took place in the value cloth; it was then the interest of the buyers to cancel if they could find a loophole to enable them to do so, By the steps we took we had only a few hundreds cancelled, while if we had not started the night work we would have had many thousands. I may mention that we paid the hands much higher for night work; we reckoned the day eight hours instead of ten, and many of the hands preferred the night shift as they could make the most money by it; but the work was both more costly and worse executed.

(5.) If obliged by law to stop at a particular time the men would break off in the middle of a set of pieces, and would require to readjust their machinery and put all in order as if they had a fresh colouring to print. No person acquainted with the routine of a printworks would ever dream of such a thing. Any benefit from such a regulation would be an imaginary one.

(6.) Many of the parents take every scheme to get their children passed as 13, so as to avoid sending to school. This is the case with many who are well off. Any alteration of the law without obliging the children to go to school and to show results from that schooling would be doing the majority injury instead of good. The parents often send their children to school merely the time necessary to enable them to get their certificate and to be enabled by law to work, and the same system is too often kept up till manhood.

General remark.—If you were staying a short time in a country district where there were a couple of printworks, the one working till 6, the other till later hours, you would soon form an opinion for yourself as to which was most for the benefit of the hands generally. It is when the hours are short that the public houses are most frequented. It may be said this is not a necessary result. Perhaps not, but it is the actual one.

37. *Elijah North*, machine printer.—I am well satisfied with the hours of work as they are. I like making overtime. I would sooner work from 6 p.m. to 8 p.m. all the year round than not. I can get more money by overtime, and there is nothing else to do in the evening here, except see the hills. In a town it is different. Many men say that overtime money does no good. That is their fault. I find it clear gain. No doubt many in these works would like short hours.

38. *Mr. William Richardson* (The Hayfield Printing Co., Hayfield) manager.—During the 15 years that I have been here I have had the practical management of the works for the greater part of the time. Since the American war began trade has not been so good as it was before. It was a common thing then for these works to be going till 9 p.m. I have known them do so for nine months together; the works generally I mean, not merely some parts. If trade is anything like good we reckon the average time of working here to be from 6 a.m. till 8 p.m. There is not much difference between the different parts of the works in this respect. The dyehouse only works about the same time as the printing machines. Here the dyehouse and its different parts, the dyebecks, washing machines, soaping machines, &c., are arranged in such proportion to one another and to the rest of the works that they can generally do the amount of work required without working longer than the other departments. The bleaching department is more liable to be irregular. Sometimes it will be working till 8 p.m. when the other parts are working only till 6; and occasionally it has to work till 9 or 10 p.m. This is likely to be caused by our having an order for a kind of cloth which we do not happen to have in stock at the time, and which consequently we have to get, which causes some delay. As a rule the company prints its own cloth.

In the natural course of things the warehouse part of the work is rather behind the other parts. When they are going till 9 o'clock the warehouse will be at work till nearly 10. The goods are packed and sent off in one of our waggons as late as 11 or 12 o'clock in such cases.

After the goods are dyed they must be washed on the same day, but may wait for a short time; we are not particular up to half an hour or so. After they are washed they can wait for drying, except certain certain kinds of colour, such as orange and steam colours, which will not lie at all, but must be dried immediately, *i.e.*, within a quarter of an hour or so. This drying is done in the finishing room, and girls are engaged in this part of the work.

The meals are taken at regular times, by the whistle, throughout the works, except in the dyehouse. When we work till 8, which we commonly do if we work after 6 at all, tea time is allowed also. We consider here that stopping the regular times for meals is no loss, as the time is made up for by the rest and refreshment. Of course meals must be taken in any case, whether regular times are allowed for them or not, and as the time actually taken for a meal could not well be less than a quarter of an hour, this amount of time would have to be paid for though no work was done in it. The dyehouse, however, cannot stop for meals. If there are dyehouses in which any of the hands stop for meals, I am not aware of it. We should consider it a loss. The hands can take their meals at their work.

All employed at the dyebecks are men. If the boys in the washing part were required to stop early, we should have to put down another washing machine. This would not enable the work to be got through by the earlier hour, say 6.

All parts of the works begin at 6 a.m., and the women come then as well as the other hands. Ten minutes grace are allowed, and any hands not in by then lose an hour, so they are punctual enough. We never have night relays, nor have we block printers. There are about 200 persons employed here altogether.

The children are sent to school a week in each month, and at the corresponding date in each month. I do not know at all what the state of their education is; I have too much else to do to inquire about that. We prefer full-timers if we could get enough. If we were required to have double sets of children it would not be a bit inconvenient so far as the work is concerned if we could get enough of them; we should have to teach more children their work, but this is quite simple and would be soon learned.

The workpeople here, I believe, have not taken any part in the 10 hours bill movement. In case you should wish to speak with any of them when you came, I chose out those two (Nos. 40 and 41) as the most suitable. Both are quiet steady men, and the first an unusually good and intelligent workman.

39. *Mr. Abel B. Wimpenny, jun.*, in a letter with the above when returned approved of my adding that he, "representing the firm, concurred in this statement "(No. 38), so far as his acquaintance with the works "extended, *i.e.*, over the last seven years."

40. *Thomas Gould*, machine printer.—I have heard that there was some inquiry into printworks. I have heard, too, that there was a society amongst the print-workers to obtain a Ten Hours Bill. I have not taken any part in it, and, so far as I am aware, none in these works here have; but I think that such a bill would be a great boon. Any one that I have talked to seemed favourable for it, but I have not said much to any one. I do not think that it would have the effect of diminishing our wages. Now if we are pushed at one time we are slack at another. Also, if a man works till 10 o'clock he wants more food to support him; so what he gains in one way he loses in another.

It is very rare that we work after 8 here. I have been here about three years; but I have been in two or three other printworks since I was about 9 years of age. As a machine printer I have worked till 10 at night often, and I have sometimes worked all night as well as the day, *i.e.*, from 6 one morning, through the night, and on till 10 the next night. When I was a plaiter down at a printing machine, I have worked in the same way from one morning till 8 or

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10 at night of the next day. I did that repeatedly as a boy from 13 years old and upwards. If a boy was small and got knocked up by working at night, the men would send him home and get a man in his place.

41. *Joseph Marshall*, in the dyehouse, at a dollying machine.—I have thought a good deal about the shortening our hours of work. I think it would be a benefit to the rising generation, and agreeable to all if it could be done without injury to the masters. But I think that we could not stop the meal times in the dyehouse, and I have been in a dyehouse better than 30 years. It is a matter of opinion with many whether they could stop for the meal times in a dyehouse or not.

If the hours for all but the men were fixed to be from 6 till 6, with meal times in the other parts of the works but not in the dyehouse, this would be a fair arrangement between masters and workpeople. This dyehouse could turn out in the meal times 120 "lumps," or 240 pieces of 25 yards, and there would be this amount in favour of the masters.

I have not spoken to many about the matter, and we here do not take part with the printworkers' society, but those whom I have spoken to seem to think with myself. All are in favour of working only from 6 till 6.

42. *Statement of the "Printworks Ten Hours' Bill Committee" (Workpeople's).**

We represent the workpeople employed in printworks throughout the whole of this district, viz., Lancashire and the adjoining parts of Cheshire and Derbyshire. We do not mean that the whole of these people have directly joined in our organization, but such a large proportion have that we may fairly be taken as representing the class as a whole.

Our object is to get an Act of Parliament placing the workpeople in our trade on the same footing as those employed in the cotton factories, or on as nearly the same footing as practicable.

The movement for shortening the hours of labour in printworks is not new. It was in agitation years before the present Printworks Act was passed, and has never been really dropped since, because that Act failed to give what we think reasonable and just, though at certain times it has been less active than at others.

When the bleaching and dyeing works came under regulation a few years ago our trade was anxious to be included with them, and presented petitions to Parliament and exerted itself in other ways for the purpose.

The movement was more actively revived early in last spring (1867) mainly, as we believe, by a spontaneous outburst of the feelings of the workpeople on this subject when it was found that they were not included in the bills then brought in by the Government for extending the principle of the Factory Acts to almost every other branch of trade. It was a great disappointment to us to find that we were to be left out again as we had been before.

Meetings were held in the different printworks, and local committees formed, who received subscriptions from the workpeople in these shops who wished to contribute, and delegates were chosen by the shops to represent them at the general meetings. The first of these was held on the 2nd of March last, and a general committee was formed. Since then a number of committee meetings and of general meetings have been held and various proceedings taken with a view of getting our case brought before Parliament, with several of the members of which we also had communications.

Amongst others, circulars containing extracts from the report of the inspectors of factories for the half year ending on the 31st of October 1866, pointing out the defects in the Printworks Act, were sent to upwards of 700 members of the two houses of Parliament. We beg to refer to these extracts as official statements by competent authorities well acquainted with the facts, showing the existence of the evils which we desire to have remedied. We think it would be well to insert here the annexed portion of the said extract, viz. :—

"Factory Inspectors' Office,
10, Whitehall, February 6, 1867.

"We beg to call your attention to the anomalies which now exist in the regulation of several trades under legislative restrictions. We have at various times, and at some length, urged in our separate reports the abolition of the differences now existing in the hours of work in several of these trades, and we recur to the subject now in the earnest hope that it may receive your consideration. We briefly recapitulate the more prominent defects which call for amendment.

"By the Factory Acts, and by the Acts which extend those provisions to other trades, the hours of work are uniform throughout the country, and they have always given and continue to give the greatest satisfaction.

"These hours are, for children, young persons, and women, between 6 a.m. and 6 p.m., with an interval of one and a half hour for meals, and on Saturdays from 6 a.m. to 2 p.m.

"But in printworks children of 8 years of age and under 13, and females above 13, may be and sometimes are employed from 6 a.m. to 10 p.m., and, if so required, without any interval; and boys above 13 may be employed for 24 hours without any interval." p. 3.

The result of our efforts was that we got our case laid before the Select Committee on the Factory Acts Extension Bill.

Delegates were sent to our meetings from about 40 printworks, one or two from each according to the number of workpeople employed at such works, and about 30 petitions to Parliament from the workpeople in about 40 different printworks were sent up. In some cases where works adjoin each other the petitioners amalgamated. Workpeople in printworks, including all classes of them, except of course children, have contributed funds levied by means of a penny rate in support of the cause. The printworks thus represented include all the principal works in the trade in this district, with the exception of three, which had we believe, special reasons for not taking any direct part in the movement. The number of printworks in this district, not counting the small places, or those bleaching or dyeing works in which a small amount of printing is now in some cases done, is about .* From inquiries made from the delegates sent from different works, we estimate that the number of children, young persons and women who would come under the protection of such a measure as we propose is from 8,000 to 9,000.

Our movement is entirely independent of any trade societies, and represents, as we believe, the wishes of the workpeople at large.

A like movement is being made by the workpeople in bleachworks, and they wished to act with us in the matter, but as their case had lately been before Parliament, and to some extent legislated for, while nothing had been done for us since our present Act more than 20 years ago, we thought it better to keep our case separate.

Since we found that we had no chance of getting any legislation last session, and that an inquiry was to be made into the subject, we have done little more than just keep our organization on foot. At the last general meeting, which was early in August and near the end of the session, a managing committee of five with the secretary were appointed for this purpose, and to watch events as they turned up, and act

* The persons joining in this statement were six, viz. :—Messrs. John Hilton, Rhodes; Joseph Castle, Stubbins; John Sutcliffe, Radcliffe; Thomas Spencer and Levi Walker, Birkacre; and W. B. Kenyon, Newton Bank, secretary.

* This left blank, and not supplied on revision, but had been stated as about "fifty."—J. E. W.

as occasion might require. As such committee we now desire to represent the case of the workpeople in printworks.

We complain that under the present law children, girls, and women are allowed to work 16 hours a day, and boys over 13 years of age for all the 24 hours; and further that during these long periods of labour the law gives no security whatever for any interval of rest or for meals. In our opinion a law sanctioning such abuses of labour is an improper law, and ought not to be allowed to exist, whether the abuses it sanctions occur in fact or not. If they do not, such a law is useless; if they do, they ought to be forbidden.

It is the fact, and can be proved by any amount of evidence which may be required, that hours far in excess of what are allowed in factories are common in printworks. The nominal hours indeed are in most cases the same as the factory hours, or nearly so, and there are often longer or shorter periods in which they are not exceeded. But in busy times work constantly goes on from 6 a.m. till 8 p.m., and often till 9 or 10 p.m. Overtime of this kind is not merely occasional, but is often continued in a greater or less degree for weeks and months together. Nor is it confined to a few establishments, but is common to all, those of high standing as well as others, though it is practised to a greater degree in some than in others. The overtime is not alike in all departments. For instance the machine printing department may stop, say, at 8 p.m., when others, such as the dyeing and the finishing and making up departments, are working till 9 or 10 p.m. The latter departments are commonly those which work the latest. It is in the finishing and making up departments that women and girls are chiefly employed.

In some cases at very busy times part of the works in which men and boys over 13 years old are employed is carried on all through the night without relays of hands. All of us here present, with one exception, can speak from our own knowledge to cases since our Act in which boys of this age have worked through the whole night as well as the preceding and following days. This practice we have reason to believe continues up to the present time, and is found occasionally in large works as well as small, though probably it is chiefly in the latter. Work through the night by means of relays of men and boys we believe does not exist in our trade. The only approach to it of which we have heard is a plan adopted in some cases by block printers employing children from 8 to 10 years old as teerers in relays, working, the one from 6 a.m. to 2 p.m., and the other from 2 p.m. till 10 p.m. This was a concession by some masters to the children in place of the 10 hours system. It does not so much apply to the present time, because much of what formerly was done by blockprint is now done by machine.

We do not, however, wish to put forward any cases of an extreme kind, such as those of boys working through the night, or any cases only extreme or exceptional, as the ground on which we desire a change in the law. We wish to go on the fact that hours far in excess of the factory hours are permitted, and do as an ordinary fact not unfrequently occur in printworks of all kinds and in all places.

It is true that the hours of work in our trade are now, as a rule, shorter and more regular than they were formerly. We fancy that since last March, when this question was taken up, the hours have been shorter than usual.

It is, we believe, true that there are a less number of print shops now at work than formerly, but it is also true that many works have been extensively enlarged. As a proof of this we may mention that the total number of machines now at work exceed by about 150 the number at work 20 years ago, and further, each machine produces considerably more work now than at any previous time. We calculate that the present number of machines is about 650 against 500 twenty years since. And the number of "pieces" printed shows a still greater proportionate increase. We have it on the highest authority, Mr. Potter, M.P., that in 1830 the total number of pieces printed were about 8,200,000, and the same authority estimates that in 1859 no less than 27,000,000 pieces were exported alone.

There was, of course, less work during the American war, but our trade was not nearly so much affected as the cotton trade. During that period long hours occurred, as at other times, on the occasion of what are called "pushing" orders. About the year 1859 was, we should say, the busiest year in our trade.

The pressure is caused by orders for the home trade as well as for the shipping trade. In the shipping trade a push often happens a few days before the 24th of the month to get goods delivered by then, because the time of their being paid for depends, we believe, on that.

To remedy the evils of which we complain, we desire that "day" and "night" should be defined according to their natural meaning, as they are in the factories, viz., from 6 a.m. to 6 p.m., and from 6 p.m. to 6 a.m., and that no child, young person (as defined in the Factory Acts), or woman should be allowed to work at night or without reasonable times fixed for meals. These hours are as long as any people ought to be required to work, and it has been amply proved by the prosperity of the cotton manufacture since these limits were imposed upon it, that they in no way interfered with the successful carrying on of the trade, though just the same arguments were used by the cotton masters then as are used by some masters in the print trade now as to the impossibility of carrying on the trade successfully under such restrictions. They feared that they would be ruined. But what has been the result?

We are convinced that the effect of like restrictions would not be any more injurious in our trade. The trade would depend then simply on the law of supply and demand, as it does now. When there was a demand it would be supplied. If some of the works could not supply it, others would, so that there would be no loss to the trade as a whole. It would equalize the work throughout the year, not diminish the work done.

We see that this does not meet the case of other countries competing with this, were they able to do so. But we believe that as to the good durable prints, which are the chief kinds produced here, there is no chance of this. France cannot at all compete with Lancashire in these or in good fast colours.

It is said that our trade is one of seasons, styles, markets, and so on to a much greater extent than the cotton trade, and cannot therefore be carried on so evenly. But, without insisting on the fact to which we have referred, that arguments of a like kind were used in the case of the cotton trade, we say that the real question is simply one of orders in sufficient time.

Orders for different styles or markets come at any time, and whenever they come of course they are taken, as under the present law pushes can be made to complete them in a given time if necessary. But as a fact it often happens that when an order is wanted by a given time, and cannot well be done in that time, a further time is asked for and is allowed. So it would be if the hours of labour were limited as we wish. Or if it were necessary that orders should be done by given times rather longer notice would be given.

As to seasons and styles, it is well known when the seasons are coming round, *e.g.*, spring succeeds winter, and so on throughout; and the patterns of the different styles are, in fact, being prepared months before the goods are wanted to be printed. It is sometimes said that, as styles commence in a great measure in France, and are brought from there over here, we must make a push to get the prints out as soon as the French. But the length of time which the styles are known beforehand, as above shown, is sufficient to avoid the need of any excessive push to produce prints of any given style.

In regard to meals, we think that we ought to have

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a proper time guaranteed for them. We find that they do not do us half so much good when eaten in a hurry. In parts of the work, too, the workers are exposed to deleterious drugs used in the printing. Even men feel the bad effects of the present system as to meals. If they are bad for men, how much more so must they be for children.

In the dyeing and soaping department, wherein a large proportion of the workers are lads, the work is carried on amidst a dense thick fog of steam. In the summer months this vapour is almost unbearably hot, and in the winter it is just the opposite, it is almost perishingly cold. The work in this department is continuous, there is no cessation of work for meals either for men or boys; all eat their meals whilst at work. We think it but reasonable and just that lads working under these circumstances are deserving the consideration of the Government and the legislature, and be protected from the additional evils of the long hour system; but we all here know that this department is one that generally runs the longest hours at busy times.

Another point we think ought not to be overlooked in this matter. In the same family one may be employed in printworks and others in factories, and thus the mother may have to prepare two meals at separate times. If the meals in printworks were required to be at stated hours they would probably be at the same times as usual in factories, so that the family dinner could be made at one time, and thus assist the mother to economize in laying out the weekly earnings.

The practice as to meals varies in different printworks, and in the same works different departments have meals at different times. In some they are regular, in others not, or are not so in busy times.

We desire also that the law should make provision for the education of the children as in factories. Our present law is of very little use in this way, and the system works very badly for the schoolmaster and children alike. The children, attending school only at such long intervals as many do, forget what they have been taught, and are no further on when they return to school than when they left it. In some cases they are sent to school at odd times when work happens to be slack, in others for the whole six weeks at once; but there are also cases in which they are sent regularly or nearly so.

If work stopped at a regular hour, as 6 o'clock, those who are over 13 years old would be able to attend night schools, and we think that the opportunity of doing so ought to be secured to them. This is one ground why we wish that the definition of "young persons," for boys, should be extended from 16 to 18 years of age. We think that the opportunity for education at night schools ought not to stop at 16, and that a two years longer time would be desirable.

A bill was prepared embodying our main view, viz., a limit of 10 hours, or a Ten Hour's Bill as we call it. We hand in a copy of this. It was a question with us whether we should try to get our trade included in the bill of last session for extending the Factory Acts, or have a separate bill amending our present Act. Our object was the same in substance in either way, but as a matter of form, and also of practical convenience, we decided in favour of the latter.

The limits proposed by it are in fact rather less than ten hours, amounting to only 59 hours in the week. This was because printworks in general do stop at 1 p.m. on Saturdays. This however is in some cases made up by working an hour extra on Friday night. But some works in special cases run later on Saturday, but none later than 7 p.m. In one place, as we understand, sometimes there is no work on Saturday, but the time is made up by working longer on the five other days. They work 10½ hours for a day the first five days, and *if they worked* on Saturday, 8 hours would be called a day; but they work two hours extra per day the first five days, and by that means the master gets an advantage out of the employed to the extent of two hours. We only know of one shop where this is practised.

Also our bill makes no provision for the education of children. It was prepared in a hurry and directed especially to our great object, viz., a ten hours limit, and we thought that if we could get that, other things would be provided for without difficulty.

It is true that there was some difference of opinion as to the practicability of our measure in its entirety. It was represented by some practical men that owing to the nature of the dyeing process it would not be possible to have fixed times for meals in that department, at least without great inconvenience and loss. It was also thought that if the liberty of working in meal hours were left, it would allow of time being made up in this way on pressing occasions sufficiently to remove any real difficulty on the part of the masters. Indeed, we were led to believe that if this were conceded, the masters, or many of them, would not oppose a restriction of the hours to the limits of 6 a.m. and 6 p.m.

This question was fully discussed at several meetings, but it was always decided by large majorities, on one occasion by 74 to 6 votes, to keep to our original proposal. There appeared to be a feeling that the general body having decided on that point, we as a committee appointed to carry out their decisions could not properly withdraw from it, and further that it was not desirable to do so. Of the foremen dyers we believe that nine out of ten would be in favour of the 6 to 6 bill, but we believe nine out of ten of the men are in favour of the ten hours bill. We found our belief on this point from our general conversation with the men, and from the discussions and statements made at our general meetings.

The workpeople, we believe, are most strongly set on obtaining a cessation of work at 6 o'clock. The great value of this to working men is that it allows time for the comforts of our homes and families being attended to in the evening, as well as for the instruction of the young, where desired, and for our own improvement or reasonable amusements.

We see others around us having these advantages, and see no just reason why we should be excluded from them. More especially now, when Her Majesty's government have been taking under protection every other kind of work of women and children throughout the country, we think we may fairly ask, What is there special in us that we should be less cared for?

Hitherto with all our efforts we have been put off or passed over time after time. We trust that we shall be so no longer. We have great confidence that this government will deal fairly with us.

We are aware that if the effect of any legislation such as we wish for would be really to injure the masters, and so discourage or diminish the trade in this country, the loss would fall upon ourselves in the end, and we should not be so unwise as to seek for such legislation. But we are satisfied that there is no ground for any such fear.

A slight increase in the power of the works, *e.g.*, by adding a little to the machinery or taking a few hands to provide against emergencies, would, we believe, be sufficient to meet the difficulties. If on occasions 20 machines cannot get through the work wanted without working till 8 o'clock, a few more would. We cannot shut our eyes to such facts as this. In several cases masters already have been or are making additions of this kind or enlarging their works, with a view, as we believe, of meeting any difficulty resulting from an anticipated restriction on the hours of work.

Even if the effect of such legislation should be a little against the employers or our own immediate profit, it is only fair to set off against this the gain which would result to all parties from the increased well-being and improved education of the working class.

We have no wish whatever that anything should be done which would be unjust to the employers or seriously injure their interests; and if it could be

really proved that the restrictions which we desire would be likely to have that effect, we can say, certainly for ourselves, and we believe for the workpeople at large, that we should gladly accept any reasonable modifications of the Factory Acts which were shown to be really required by the necessities of the trade.

It is, however, necessary that in order for anything to be done it should be done by the law. Many of the men, ourselves amongst the number, do not believe in anything but an Act of Parliament for such an object as ours. Even if an agreement were made by the masters with us, which we do not think we have any chance of, it would be sure to be broken through by some before long, and then the others could not keep to it.

We certainly have heard of people wishing for a law to restrict machinery from running beyond certain limits, without reference to the class of persons employed by it; but such an idea has never been entertained or spoken of at any of our meetings, and it is no part of our scheme, and on behalf of our trade we entirely disclaim it.

We believe, indeed, that if the labour of children, young persons, and women were limited to certain hours, it would probably in ordinary cases be found convenient to employ men also only within the same hours, and we admit that we are desirous of this. But in our opinion this is what we may reasonably and properly desire, and we see no reason to conceal our wish.

In banding ourselves together and in working together in this cause, we have had from the commencement purely and simply one object in view—the increased happiness of ourselves and our class and, as we fully believe, the increased prosperity of our employers. We are firmly convinced—and the experience of those already under the operation of the Factories Act strengthens us in our conviction—that if the legislature extended to us the blessings of those Acts it would confer a boon on ourselves and on our families. We as working men are striving to promote the physical, social, and moral well-being of all, but most especially have we laboured on behalf of those who on this question are of themselves helpless, the women and children employed in printworks; and now we have made their cause known we confidently leave the question in the hands of Her Majesty's present government, fully assured that they in their wisdom will see that justice and right shall be done.

43. *Mr. James McAdam* (Mr. C. Saxby's, calico printer, Furness Vale), manager.—I was brought up with a practical acquaintance with printworks, and have all my life been more or less closely connected with them, including Scotch as well as English works.

For years I have given particular attention to the kinds of question now put before me, and studied all the details of the work with the special object of shortening the hours of labour, and I have succeeded to a considerable extent. It is difficult to compare the average hours of work here now with what they were when I came here, now seven years ago, because, though the hours were often longer than they are now, they were broken by more frequent intervals of slacker work; but I should say that it might be taken that about two hours had been saved on the whole. Taking, that is, our average time of stopping work then in busy times as 9 p.m., in busy times now it is 7, except in a few cases where later work cannot be avoided. During the American war there was great pressure at times, owing to the risk of repudiation of orders. For the last few years, however, work has been pretty full and steady.

The whole of the printing done here is for clients, as we call them, on cloth sent by them to be printed, and belonging to them. This may perhaps make it slightly more difficult to secure regularity of hours than if the employer printed on his own cloth, but so slightly as to make little if any practical difference in this respect.

Overtime is objectionable in itself and does not answer, and we set ourselves as strongly as possible against it. If men are working long hours, such as till 10 p.m., for a month, they are not able to work effectively; but if they are working steadily only moderate hours, till 8 or 7.30 p.m., they can continue this for months.

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When I was first here the body of the works was frequently going up till 9 p.m., and sometimes those in the finishing department up till 10. But for the last two years I should say, in consequence of certain improvements which have been made, we have never worked up to that limit. We should never work the printing room so late now, unless in a very exceptional case, such as a breakage of machinery. That would be the only case. In the finishing department we still cannot avoid sometimes working late, but since the machinery there has been improved and increased, so that it can always do something more than is ordinarily wanted, and thus allows a certain margin for special times, we have managed to do with very little excess of the hours there. It is in the finishing that the girls and women are chiefly employed. Women and children are also employed in preparing grey cloth for bleaching, in the process of drying white cloth, and preparing the same for printing machines.

The stated day here is from 6 a.m. till 6 p.m., which is the regular working day in all printworks in England and Scotland, I believe, the only difference being that in Scotland two hours are allowed for meals, while we give an hour and a half. Saturday work stops at 1 p.m., but an hour extra is worked on Friday night to make up for this. Cleaning of machinery and completing parcels of goods which would spoil if left till Monday often require a portion of the hands to work until 2 or 2.30 p.m. on Saturday, and any work done after 1 o'clock on that day is paid for as overtime.

The actual hours, however, differ somewhat from this standard, and are not alike in the different departments. All begin at 6 a.m., except in the case of the dyehouse, in which some of the hands, but only men, come before that hour. The ordinary time of working in the different departments is as follows, viz., in the bleaching till 8 p.m., in the machine printing till 7 p.m., in the dyeing till from 5.30 to 7.30 p.m., and in exceptional cases till only 4.30 p.m., in the finishing till 6 p.m. only.

The full amount allowed for meal times is taken except in the dyehouse and bleachhouse, where it is impossible owing to the continuous nature of the processes, and except as regards breakfast at the printing machines. In other respects there is no fear that the full time will not be taken, as the hands are all paid by day wages. For breakfast there is no general stopping of the printing machines, but the hands at each take their breakfast as near the usual time as may be convenient. There is an inconvenience and loss in any stoppage, and breakfast is too near the beginning of the day's work and the time required for the meal too short to make a stoppage desirable then. But all the printing machines stop as nearly as possible at 1 o'clock for dinner. Some will be able to stop close upon the time, others five or ten minutes before or after, so that the whole probably stop within a quarter of an hour of the same time. It will never happen that their work quite agrees. Of course I am very frequently in the room, but I do not remember having seen all the seven printing machines at work at once ever since I have been here.

In the dyehouse the part of the work which is essentially continuous is the actual dyeing process, and in this only men are engaged. The process varies in length, according to the kind required, from an hour and three-quarters to three hours and a quarter, but is commonly about two hours and a half or two hours and three-quarters. This is exclusive of the time for putting in and taking out, which must necessarily be added, and cannot be interrupted.

The boys in the dyehouse department are engaged at the washing machines and the cleaning processes. In this part of the work, at great inconvenience, I tried to arrange so that there should be, as a rule, a stoppage of half an hour for dinner, and I have succeeded in

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this, though there may still be times when this must be dispensed with. The men however, made great opposition to this arrangement at first on account of their losing their overtime during dinner, and consequently having to stay half an hour later in the evening, and I had to dismiss some in consequence.

The process of bleaching for printing differs from the bleaching in ordinary bleachworks, with the general nature of which I am acquainted. That relates merely to the surface, the object being simply to whiten and finish that.

For printing the bleaching must be more thorough and go more into the interior of the cloth so as to remove all stains or impurities, *e.g.*, grease, which may be there, and which would only come out and show after the printing, as we find by experience, even though the surface might have appeared perfectly white before. Consequently our bleaching requires more processes, more care, and longer time. It takes on the average about six days. If general bleachers say that their process is less simple and a matter of more difficulty than ours, I do not understand how this can be, unless they refer to the finishing. There are boys employed in the bleaching department here.

We do not work at night by relays. The only case in which we should work at night at all would be if something very exceptional required it, such as an alteration or repairs of parts of the buildings. Such a case would not happen perhaps once in a year or once in five years. If it did arise I should send off the younger boys, *e.g.*, those under 14 or 15 years old. I have known cases elsewhere of night work in the dyehouse, and also in machine printing, but there is very little night work in the trade ; I do not consider it practical. Night work does not answer.

The number of persons employed here, exclusive of persons connected with offices, mechanics, &c., is about 130. There is never any block printing here.

I know the Factory Acts well, and have considered their provisions carefully with reference to such an employment as that in printworks, having, as I have already said, given special attention to the question of shortening hours, &c. I feel confident, for reasons such as I have referred to, that to place printworks under those Acts would most seriously interfere with the successful management of the business.

I would suggest one point, however, in which the present law regulating printworks might be improved with advantage, viz., as regards the education of children. I do not consider the educational part of this Act worth anything. The six weeks which the children here get by it away from work rests their bodies, it is true, and is a more complete and useful change to them so far than the unvarying monotony of work and school under the factory system ; but as regards the amount learned in them the six weeks, are of no importance at all to the children. I have tried them several times and find very little progress in them. A boy who is always at work or running about wants six weeks before he settles down at a school. Children learn more in one day in a week at a Sunday school than in all their six weeks put together.

The parents are entirely indifferent as to the schooling, except as a means of qualifying their children to earn money, though they are keen enough as to that. Lately a boy came and applied for work here apparently so much under 8 years old that I questioned him : "Are you 8 ?"—"Yes." "When ?"—"Yesterday." "Have you been at school ?"—"Yes, six weeks." When the children are sent to school from work the mothers grumble at their not being able to bring home wages. One whose child could not be taken because it had not been at school, said that it was a great hardship ; and when I told her that she could not get her child into any work at which she would not have to attend school, unless she sent her into a coal pit, said that she wished she could send her into one.

If some stimulus could by any means be applied to the parents to make them care more for the education of their children it would be a great benefit. I would suggest that perhaps some educational test might be required as a condition of employment.

44. *Letter from Mr. James McAdam with the above.*

* * * Since your visit I have given some attention to the matter of education for children employed in printworks, and am of opinion that the most important period for that purpose is entirely lost sight of by the existing Act of Parliament.

The period I refer to is between the ages of 5 and 8 years.

A very moderate attendance at school during these three years would form a good groundwork, and, supplemented with a well regulated system for schooling from commencing work until 13 years old, would in my opinion do more than can be done by any of the existing Acts, either factory or printworks.

It appears to me a hardship for a child to be taken at 8 years old from a state of almost uncontrolled freedom and put to learn to work and learn to read almost at the same time. * * *

45. *Mr. Gibson* (Messrs. S. Matley & Son, printworks, Hodge), manager.—Most of the teering here is done by machines. We have two kinds of these. A very few children are wanted to teer, but only for certain kinds of work for which the teering machines are not suitable. About 30 of the block printers are women. There are from 200 to 230 persons employed here altogether.

Since I have been here, which is only a short time, about two months, the overtime has been confined chiefly to the dyehouse. The other parts are pretty equally balanced, and as a rule can do their work in the time. We do not like to work later than 8 p.m. for overtime in any part. It is a loss. The dyehouse sometimes works as late as 10. Only two boys, the youngest I should say 16, work there with the men. The bleaching very seldom works after 6, because only a certain amount can be put in the boiling kiers.

The children are sent to school every other day or for the half days. It depends on how many can be spared.

46. *Mr James Ingham*, calico printer, Watford Bridge New Mills, a magistrate for the county of Derby.—I have been engaged in the printworks business 50 years, but am now about to retire and hand over these works to a successor. I do not think that any alteration should be made in the law by which printworks are now regulated. The few half-timers whom I have are sent to school regularly for six weeks at a time once in each half year, which makes up the amount required by the law.

The printing part of the work might be carried on regularly within fixed hours, but not the dyeing.

All boys under 16 years of age are regarded as coming within the Act as to their hours of work, and those between 13 and 16 as not allowed to work after 10 p.m. Certainly that has always been my belief, and I have acted upon it.

47. *John Pennington*, foreman dyer.—I have been 30 years in the dyehouse here. We work in summer from 6 a.m. till 5.30 p.m., and in winter from 6.30 a.m. till 6 p.m. We have worked overtime when it was required up till 7, 8, or 9 p.m., but that is as late as we go. We have worked till 10 p.m., but very seldom, and not for a long time past. We have been running on till 7 or 8 p.m. for three weeks or a month together perhaps, but not often. I do not think there is another shop on the river so regular as we are. I say so, because people can tell very well what time their neighbours are working.

Four rounds is what is reckoned a general day's work in a dyehouse, but they are not always the same length. One kind of dyeing which we do takes two hours and half, and another an hour and three-quarters. We may have several of the longer kind one after the other or not, it just depends on circumstances. If a round is begun we must go on with it, or the goods would be spoiled. If there

is not time to finish them one day, I have to leave them till the next (*i.e.*, altogether).

The beckmen must keep agate all the time during the day, so they give over an hour sooner than the others. But the boys always stop half an hour for their meals when the bell rings at 8 and 12, and stop about 20 minutes also for tea at about 4, but not by bell. If any of their work must be going on I shift a man from something else to the job. If they stopped longer than half-an-hour for dinner, it would throw me quite zig-zag. The men could not work without the boys.

There are ten men and seven boys, only one of them a half-timer, in my department. We call all older than the overtimers, *i.e.*, over 16 years old, men, as they can work the same time as men. The youngest of the dye-beckmen is nearly 16, I should say.

48. *Thomas Fletcher*, foreman bleacher.—It is very rarely that we work later than 6 p.m. in my department. We work overtime when it is wanted, up till 7 or 8 p.m., but in the seven years that I have been here we have never run the machine after 8 o'clock; it has been chiefly at odd times only that we have worked as late as that. There is half an hour for breakfast at 8, and an hour for dinner at 12; these are always taken punctually and for the full amount of time. There is tea time allowed besides. I have a man and five boys under me. These boys are all under timers. I used to have over timers, and could do with only four of them. They got 6*s.* a week, the under timers get 5*s.*

49. *Mr. John Burnand* (the London Vale Printing Co., Prestwich, Manchester), managing partner.—Since railways and telegraphs have become so general the busy times in the print trade have been much altered. People will not go into things now till they actually want them. The draper, who gets a given length of credit, will not order from the wholesale houses till the last moment, nor the wholesale houses from the printer.

There are only two seasons for the print trade, viz., for the spring and for the autumn or "fall" trade. These make the greater part of the print trade for the year, though of course some things are going on all the year round. In preparing for the spring season our busy time used to begin about October, and we had to deliver large quantities of goods before the end of the old year. Now it is soon enough if a lot is sent in by January or February. For the autumn trade we begin to get patterns in May, and samples in June, and to work on these in August or September.

There has been a great increase and improvement in machinery of late years. Fifteen years ago it took 12 men at dash wheels to do what is now done by a washing machine with one boy. A thousand pieces can be tied together to go on without any stop. So in the case of the soaping becks. We should have to work night and day on the old plan to do what we now do with the improved soaping machinery.

There would be a difficulty in having short fixed hours, like the factory hours, in the dyeing and bleaching. Only men work at the dyeing, but there are boys who work at the soaping and washing machines. It could be arranged for these to have meal times. There are always some spare lads about, and one of these takes the place of another at the machines when he has his meal. At bleaching the boys have meal times.

We could arrange so that the printing machines need not run after 6 o'clock. They run till 8.30 sometimes now, but we have put down additional machines, and could put down more if needed. So with the drying. If the girls who plait down at this had to leave at 6 o'clock, we could manage by putting down another drying machine.

If one part of the works is busy all are generally busy together. It would be a good thing if the hours could be regular, as in the factories, and I should not mind a law to this effect if the men were not interfered with.

We employ no children. The people about here are all well off, and the children are well looked after and have good schools.

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50. *Messrs. Bradshaw and Hammond*, calico printers, Reddish Vale.—(In the answers to the printed form the excess of the usual hours is given as occurring on about 150 days in the year, and the limit as 9 p.m. Further details as to the hours and other points were stated at the works by Mr. A. Hammond, and by Mr. W. Browning accompanying him as manager, but these statements not having been returned for revision, as proposed by me in case of my requiring to avail myself of them, are not further referred to, except as required in illustration of No. 55 *q. v.* note.—J. E. W.)

(1.) The hours of working at printworks are necessarily very irregular, consequent upon the nature of the business. For instance, in our case, we being printers chiefly for the home trade, in September and October we are very flat, sometimes not working full time, getting our new patterns and styles ready for the spring trades; these are done in small quantities to show as samples or specimens. Then in November, December, and January we are exceedingly busy, executing orders for goods to be delivered in February. And we must have them for each customer ready at the same time, or those that got them first would have an advantage over others. This remark equally applies to our fall or autumn trade.

(2.) We consider the shortening of hours would in many of the printing processes interfere materially in the working of them. And particularly any interference in males from 14 to 18; in many cases these youths are of as much service to us as full grown males.

(5.) We think one provision of the present Act might be altered with benefit both to employers and the children. We allude to the clause which prevents children being employed unless they have been at school 150 hours previous to any employment in printworks. There is such apathy displayed by some parents in sending children to school, the excuse being not able to afford, which in many cases is true. Now such being the case, they are unable to be employed by us, and consequently they remain at home idle, or find employment where schooling is not required until they attain an age when we can take them, whereas, if we could employ them without this provision, they would at once commence to obtain some education, and be regular in their attendance at school, whereas now, in many instances, they remain at home idle and obtain no education whatever.

51. *Mr. R. Hammond.*—Remarks upon the Factory Acts Extension Act, 1867, with regard to its application to printworks (made upon the official abstract of that Act, supplied to Mr. Hammond for this purpose.—J. E. W.).

The term young person to mean a person between the ages of 13 and 18. I look upon this as an injurious clause, because with us males over 16 are quite as good as grown up men, and in many cases where they have been educated to the trade from youth, better; in fact, at 17 and 18 they consider themselves men, and receive wages as such.

I also am of opinion, that posting up the times of the day and the amount of time allowed for meals would be extremely inconvenient, for where a process is continuous or incomplete, we should wish to go on by relays, and to have one person work whilst another is having his meal time.

Then again not allowing them to get their meals in the rooms where they are employed could not well in printworks be carried out, as the rooms generally are well ventilated and comfortable. And when not so, those employed therein go to have their meals in the comfortable ones.

Again, printworks for the most part being in the country, the hands have often to come such a distance as would prohibit them going home to their meals, and I know of instances at present where men, although living within five minutes walk of the works,

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prefer staying in the works, and having their meals sent from home. The chief reason is that they congregate together and hear various items of news, &c.

Another clause, which prevents the employment of women and children after 2 o'clock on a Saturday,—in printworks this ought to be 4 o'clock, as we have a deal of cleaning to do on that day, and women are generally required to it.

Then again, the fixing of holidays by law would not work as well as the allowing them to be regulated by custom in the various districts; for instance, with us the hands would much rather have Easter Monday than Good Friday, or New Year's Day than Christmas Day. I speak now, from an experience of 25 years, during which we have always worked Good Friday and Christmas Day, and never had a single application to alter them.

You asked me: Could I point out any modifications of the Factory Act as applied to other trades that seemed most likely to meet the requirements of the print trade. I have read them carefully over, and the application of the Act to paper mills seems the one I should adopt, supposing any alteration was found necessary to be made in the present Act.

What I consider the most important point to press on your consideration is the interference with the labour of male persons over 13 or 14. And I don't see that any hardship would be inflicted upon them were we allowed in cases of necessity to work them, say, not more than two nights in any week.

52. *Letter from Mr. Hammond.* — (In reply to letter asking the meaning of "nights," as used in the above remark as to the employment of males over the age of 13 or 14.)—* * * I mean, supposing any further limit to the working hours of printworks became law, then I cannot see that any hardship would be inflicted upon males over 14, were we allowed some provision in the bill, whereby we could employ them in cases of necessity for two or even three nights per week until 10 o'clock.

Were this allowed, it would work in this manner. That should any department in the works be a little over pushed, then we could take those males over 14 from other parts of the works, and send home the young ones without any disadvantage to ourselves.

53. *Robert Smith*, machine printer.—The general feeling of us here is for being under the Factory Act. We wish ourselves and our children to have the same advantages as we see the factory workers having. We are aware that if we worked shorter hours we should draw rather less money, but we should be glad to sacrifice that for the comforts which we should gain. Also, there is no doubt that the work would come less at one time and more evenly at others. We think it very hard that we should have to be here often till 8 and sometimes 9, and then get home, many living, say, 40 minutes off. These, if staying till 9, cannot get to bed before half-past 10, and have to be up before half-past 5, and that does not leave sufficient time for rest. We work more than half the year till 8 o'clock. When we leave at 6 o'clock I feel grieved sometimes to think that the dyehouse people will be staying on late.

There are many children in printworks. From 10 years old is a common thing. They ought not to be kept so late as they often are now. When they come they are on half-time, and by 13 have not more than just learned enough to get a thirst for really learning. They ought to be able then to have time to improve themselves in the evenings.

Though we have these views we do not now take part in the Ten Hours Bill Association, though there were subscriptions from here for the first two or three months.

54. *Stephen Lees*, colour mixer. — I agree with what the machine printer has said. We work much the same, but often give over an hour sooner. I am not paid for overtime, so it might seem like self-interest in saying what I do. It would be well to ask some of those who are. But I feel sure they would all say the same.

55. *William Browning, jun.*—I am in the dyehouse learning the business and have been so a year. I wish that we could have shorter hours. It comes hard on me. I wish to have my evenings for different things, such as French, &c. It has been a common thing for us to work till 9.30 p.m.; that is five rounds. Four rounds take till 6.30 p.m.; we are making this now and reckon it slack.

[It appeared from what was stated by Mr. Hammond and the manager that the hours here named for the four and five rounds are correctly given, and that the dyehouse would average five rounds for half the year. But see remark above, in No. 50.—J. E. W.]

56. *Mr. R. Kay*, Castleton printworks, Blue Pits. —The hours of labour at these works are from 6 a.m. to 6 p.m.; the fixed meal time, dinner, from 12.30 to 1.30. Owing to the intermittent nature of the work, the breakfast and tea are taken (without hardship) as most convenient. Certain departments, such as the dyehouse and finishing, are frequently employed from 6 a.m. to 8 p.m., or even to 10 p.m.; the machine printing, where only six stout lads are employed, rarely beyond 8 p.m. No teering children are employed, there being no block printing, and all children are paid directly or through their parents. Education in conformity with present Printworks Act, the greatest attendance at the commencement of each month. The dyehouse meal times are irregular, owing to the continuous nature of the processes, but are not *shortened*, but arranged. Children are only employed here on very light work. The argument for exceptional arrangement, as to employment and education, remains just what it was at the commencement of the present Printworks Act. The labour is much less distressing than that of the cotton mill and the demand more fluctuating, owing to the production being one of taste and season.

57. *Letter from Mr. F. Kay* (in reference to the above).—In reply to your inquiry of 11th inst., what I meant to convey as to the meal times of the dyehouse hands is this:—They have the same *time* allowed for their meals as the other hands, viz., one hour for dinner, but it is sometimes from 12.30 to 1.30 and at others from 1.30 to 2.30, and so on, according to the times at which the dyes come out of the cisterns.

58. *Statement of R. E. S. Oram, Esq.*, Her Majesty's Sub-Inspector of Factories for the Manchester and Ashton-under-Lyne districts.

There are several printworks, bleaching, dyeing, and finishing works, and shipping houses in my subdivision.

The printworks are the most important in point of size, and include some of the principal works in the trade.

It appears to me that the Acts by which these works are now regulated should be repealed, and all should be placed under the Factory Extension Act with such modifications as may be considered desirable.

The hours of labour in printworks allowed by the present law should be shortened. At present they can hardly be said to be really limited at all, as children and women can work from 6 o'clock in the morning to 10 o'clock at night without any regular meal hours, and lads of 13 can work day and night without any limitation or any provision as to meals, so that practically there is no limit to the hours of labour under the Printworks Act.

The children do not ordinarily work the hours allowed, in fact a large proportion of the children, being employed in the block shops, leave at 6 o'clock in the evening. Most of those who work in the machine rooms and stoves leave at or before 7 o'clock, and when busy at 8 o'clock. In some printworks they work in certain departments up to 10 o'clock at night when required; for instance, they informed me at Messrs. —— works, "When busy men, women, young "persons, and children work from 6 in the morning "to 10 in the evening; we book the children's work "from 6 to 10, but they leave at half-past 9 "o'clock. When trade is good we are busy five "months in the year. We allow half an hour for

"breakfast, one hour for dinner, and half an hour for "tea. We never work all night, but close the works "at 10 o'clock." Some of the children live above one mile from the works, and therefore would have to leave home at half-past 5 o'clock in the morning, and in busy times, even in winter, they would not reach home until 10 o'clock.

At another printworks they stated, "The children "work in the dyehouse and drying room from 6 a.m. "to 10 p.m. when we are busy." (Children are very seldom employed in the actual dyehouse.—R. E. S. O.)

At Messrs. —— printworks they observed, "Before "the cotton famine, when busy we worked in the "machine room from 6 a.m. to 11 p.m. with men and "young persons, but the children left at 9 o'clock and "the women before 10 o'clock. They had half an "hour for breakfast, one hour for dinner, and half an "hour for tea.

At Mr. —— they said, "We work an odd machine "until 10 o'clock when busy, and although the ordi- "nary hours in the finishing room are from 6 a.m. to "8 p.m. we remain until 10 o'clock when necessary."

As regards block printing, employers in my district are already subject to restrictions as to the hours of labour fully as strict as the Factory Acts. All the works have, in effect, to abide by the Factory Act regulations in this department, although in exceptional cases the trade union law has not been strictly observed.

The block printers in my subdivision, with the exception of those working at one place, are in union with the "Lancashire, Yorkshire, Cheshire, and Derbyshire Calico Printers' Protection Society," and the men, together with the young persons and children employed by them, work factory hours, viz., from 6 a.m. to 6 p.m., with 1½ hour for meals, the women, however, working at the tables occasionally until 8 o'clock.

The trades union rule is as follows:—

"That the hours of labour be from 6 in the morning to 6 in the evening for five days in the week, and on Saturday until 1 o'clock; but where they are doubled, from 6 a.m. to 2 p.m., and from 2 p.m. to 10 p.m., and no further."

The male block printers do not, it appears, always abide by their own law when "working in shifts," for at one large works last year when busy the firm were willing to abide by the trade law and stop at 10 o'clock, but the men preferred working in two sets, the first working from 6 a.m. to 6 p.m., and the second set working from 6 p.m. to 6 a.m., with young men as "tearers." This apparent evasion of a trade law has not, however, escaped the notice of the union.

Where, from a press of business, it is found necessary to work until 7 o'clock to complete an order, the union allows it on condition of the payment of a fine of 2*d.* per table, that is, if only two men remained to work and if there were 50 tables in the room a fine of 8*s.* 4*d.* would be paid to the union as an acknowledgment that it was against the ordinary rule.

With reference to the shortening of the hours of labour in blockshops, one of the managers said, "By "working from 6 to 6 the block printers in our esta- "blishment have become steadier workmen during "the working hours, and I have found it no dis- "advantage, for if we hang about and the men go "out for a gill they are more unfit for work after- "wards."

One firm told me, however, that they had to refuse a large order in consequence, and another firm stated that it had necessitated an enlargment of their premises.

With reference to females there is the following trade rule:—

"That no female be allowed to *commence* blocking "in this union."

But those employed at present are allowed to remain at the place where they work.

Last year Messrs. —— wished to employ female block printers on the ground that another firm did so, but the men would not allow them. Certain classes of work the firm thought could be done as well by women as by men at a lower rate of wages, and they contend that not only are women largely employed in Scotland in block printing, but a Lancashire firm who do the same styles have employed women for many years, and the same men who objected to female labour at Messrs. —— works tacitly consented to work with women for the other firm, going to and fro between the two places as suited their convenience, and by enforcing their own laws giving the one firm a marked advantage over the other as regards cost of production. The firm having pointed out to the men what they considered the injustice of the course they were adopting without producing any effect, determined at last, in self defence, no longer to submit, and gave the men notice that they would, after the expiration of a month, introduce some women. The men declared at once that they would not allow it, and when the month's notice expired and some women were introduced, the men turned out, and those who could not get employment elsewhere received 8*s.* per week from the union, at a cost, between the 1st of April 1867, and the 17th of February 1868, of 831*l.* 0*s.* 3*d.*, and some are still receiving the weekly allowance. The firm have introduced both men and women from other parts of the country, and now employ more hands on block printing than at the time of the strike.

At a meeting of the union held at Bury, on Saturday the 29th December 1866, it was ordered: "That "our secretary correspond with the machine printers "with reference to inducing them to adopt the Ten "Hours Bill."

Most employers require their hands to work at the printworks on Christmas Day and Good Friday when busy, although those days are commonly regarded as holidays, and some persons, including cotton manufacturers, are apt to think the printworks are working contrary to the law, not being aware of the strange anomaly that it is not forbidden by the Act; a cotton manufacturer drew my attention to the fact, and thought it was an oversight on the part of the factory inspector not interfering.

I have found boys above 13 years of age working in printworks at 11 o'clock at night, of which I received complaints, although it is allowed by law. In a district where factory law prevails it is natural that the cotton operatives should think anything contrary to that was wrong. I believe, however, that so far as young persons are concerned, night work is almost, if not entirely given up in my district.

In regard, even, to overtime, the head of one firm remarked to me, that with spoilt work and less production, he found it to be unprofitable. Another person remarked, "I keep an accurate account of the "cost per piece, and find that when we work until "8 o'clock instead of 6 it costs more per cent. per "piece, in consequence of less being done during the "overtime, and if extended two hours later, spoilt "work and the less amount done per hour would "render it still more unprofitable." At another printworks they remarked, "We used to work our "machines until 10 o'clock, but found it no advantage, "as the men got tired."

With regard to the difficulties which it is said would be occasioned in printworks by a further limitation of their hours, it should be borne in mind that a great amount of time and labour has been saved by the increased use of machinery since the passing of the Printworks Act.

Mr. Leonard Horner drew attention in his report for 1852 to the substitution of machine printing for block printing, which caused only 166 children to be employed at five works, which he mentions, in 1852, whilst 1,125 were employed at the same works in 1846; and observes that the substitution of machines in which the pattern is cut on copper cylinders, instead of on flat blocks of wood, has cheapened the production and extended the demand for printed calicoes to an enormous extent. "To such perfection "have these machines been brought, that as many as

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" 10 distinct colours can be printed by one machine, " and a piece of white calico 28 yards long entered " at one end of the machine is delivered out of the " other end in less than five minutes printed with a " complicated pattern in which 10 colours are com- " bined."

Mr. Edmund Potter, one of most eminent calico printers in Lancashire, in a lecture he delivered before the Society of Arts in April 1852, states that machines are now working producing ten colours at once with the same beautiful accuracy and precision as in the case of the smaller number. " Preparations " are making to increase the number of colours to " 15; at the same time producing, as they doubtless " will, *six or seven hundred* times as many pieces per " day as if blocked separately."

Since that time 20 colours I am informed have been produced by a machine, and many styles that could only have been produced ten years since by machine and block can now be done better by the machine alone, and consequently a less number of children are employed.

At Mr. ——— they stated, with reference to block printing, " By improved appliances in place of the " labour of tearers, we only employ half the number " of children which we required in 1854."

At Mr. ——— printworks they observed that since 1846 improved machinery has rendered it unnecessary to employ half as many children as formerly in the block shop, and further improvements will shortly reduce our present number in the block shop by one-half.

With regard to machine calico printing, it is very similar (irrespective of the bleaching, dyeing, and finishing, which must be considered in connexion with bleach and dye works) to the printing of paper-hangings.

One of the largest manufacturers in the paper-hanging business wrote me some months after the Act of 1864 had been in operation, to the following effect:—" The inconveniences we expected to arise " from the introduction of the Factory Acts into our " branch of the manufacture have not arisen. We " do not find the production at all interfered with; " in short we produce more in the same time, as the " young folks are not so wearied out as formerly with " the long hours. We may say that the introduction " of the Act, hitherto, has not given us any annoy- " ance or cause of regret."

Another firm, who have extensive works in another district, expressed themselves as equally satisfied with the operation of the Act, the manager observing that " the hands employed work with more energy and " assiduity while they are at work, than they did " formerly when their hours were irregular and " unrestricted."

With reference to the opinions of Messrs. Potter, of Darwen, and Heywood & Co., of Manchester, Mr. Redgrave, Her Majesty's inspector of factories, observes in one of his half-yearly reports, that it " shows that in a trade precisely similar to that of " calico printing there is in reality no difficulty in at " once adopting factory hours, but that advantages " are also to be derived from the change."

The objections to factory hours in printworks are precisely those which might be urged by various branches of trade already under restriction, and were brought forward formerly to prove that the cotton trade would be ruined if the hours of labour were shortened, but the late Mr. Leonard Horner observed with respect to the cotton factories, " I firmly believe " that if it were proposed to repeal the law there " would be a very stout resistance on the part of " masters, independently of all consideration of the " opposition that would be made by the operatives, " and of their own appreciation of the moral and " social improvements which the law has effected and " sustained."

As most of the block printers stop at 6 o'clock and the machine printers rarely work after 8 o'clock in the evening at present, if they were permitted to work for 12 months from the passing of the Act from 6 a.m. to 8 p.m., the following 18 months from 6 a.m. to 7 p.m., reducing the time to 10½ hours work the third year, it would enable the various firms to make any alterations and procure any machinery they might consider advisable, and the bleach and dye works being included in the same Act the privilege they possess (which is so liable to abuse) of working until 8 o'clock on the plea of making up lost time, would be abolished.

Some of the bleachers and dyers are unaware of the special privileges possessed by printworks and works under the Bleaching and Dyeing Works Extension Act. With reference to the loss of the privilege of making up lost time, a member of one of the largest firms intimated to me his ignorance of the special privileges before referred to, and said that his chief desire was that no special privilege should be possessed by any of the works, but that there should be one uniform law.

There can be no good reason why the bleaching, dyeing, and finishing done in premises where the goods are not printed should be under different restrictions (as is the case at present) to premises where exactly the same work is done to goods that are or have been printed, leading sometimes to the same class of hands in the same premises being compelled to leave at different hours; the one set leaving at 6 o'clock, and the other set, of the same age and doing the same description of work, being permitted if they like to work all night.

The Factory Acts permit those employed in the various handicrafts under those Acts to work from 7 a.m. to 7 p.m., instead of from 6 a.m. to 6 p.m. from October to March, on giving notice and receiving a form signed by the inspector of factories, and as it might be considered desirable that in certain portions of the works, such as the warehouse, the hands should come later and remain later than the printers; if that clause was inserted empowering the inspectors and sub-inspectors of factories to allow them to work from 7 to 7 all the year round in such parts of the premises as might be considered necessary, it would meet the case.

As certain processes might not be completed at the hour for closing, and the goods could not remain all night without damage, it might be advisable to insert a clause granting 30 minutes for the completion, as is allowed in foundries, paper mills, &c. under the Factory Extension Act of 1867.

[Some statements relating only to warehouses and making up and packing places followed here, but for convenience are removed to that part of the evidence which relates to bleaching, dyeing, and finishing works. *Vide* No. 211.—J. E. W.]

The present educational provisions for printworks are insufficient, and the half-time system should be substituted.

At present children between the ages of 8 and 13 must have a certificate of having attended some school for 150 hours the previous six months, and the late Mr. Howell, inspector of factories, observes in one of his reports that he considered it questionable whether the formal certificate of school attendance, estimated at its true value, is worth the paper on which it is written, as it tends to spread the fallacy that a certificate of attendance at school for 150 hours in the course of half a year at the broken intervals which a child between 8 and 13 can snatch, who is allowed to work 16 hours out of the 24 without stopping, is evidence of some progress in the attainment of useful knowledge.

Children can attend school 30 days, five hours each day, to make up the 150 hours required, and then work months without attending school, and in consequence of their long absence from school obtain very little benefit from their previous school attendance. In some printworks, however, the children attend a certain number of hours every week or month, but unfortunately the parents are generally anxious that the children should attend school as few days as

possible, and complain at the works if they think the legal time has been exceeded in the least degree.

The Rev. W. J. Kennedy, one of Her Majesty's inspectors of schools in Lancashire, when writing on the success of the half-time system, stated that he considered the half-timers were equal in intelligence and attainments, on the whole, to any class of children attending the schools he inspected, and he accounted for it partially by the regularity of their attendance; and the great importance of *regularity* in school attendance was confirmed in his mind by his experience of the disadvantage of an irregular attendance, as manifested in the case of the children employed in printworks. Such children, he observes, are only required to attend school 150 hours in six months; they may make up the 150 hours when they can and as they can in the six months; the consequence is that their attendance is peculiarly irregular at the ordinary elementary schools, and the result unmistakeably is that they are *inferior in attainments to any other class of children* in the schools I inspect. I wish with all my heart that the children employed in printworks were brought under the operation of the half-time system, and I do not believe that now there is any valid reason for the difference of system."

The Rev. A.V. Hadley, H. M. inspector of schools for Lancashire, in his report for 1866, observes, "I " must record my conviction that the provisions made " by the educational clauses of the Printworks Act " are little better than useless. The children employed " in those works *are the worst educated* as a class of " any in my district."

I would direct attention to the desirability of an educational test enabling those children who can read and write to work full time one year earlier than others, as a stimulus to the parents to send their children to school. I find that generally the parents care very little about the education of their children; they are very desirous to get them passed for full time at as early an age as possible, and in printworks that they should attend school no longer than the law compels.

With respect to many girls, they are kept at nursing and other domestic matters until 11 years of age, when they are sent to work full time at the silk mill, or 13 years of age, when they are sent to the factory to work full time, without having attended school.

During the cotton famine I remarked the ignorance of some of the young women in the sewing classes, and it having been stated, without due inquiry, that it proved the inefficiency of the half time system, I resolved to select a number of cases and trace their former history, and if I found they had attended any schools in my subdivision, ask the masters for an explanation.

The result of my inquiries proved, however, that the girls had been engaged in nursing and domestic duties until they passed as "full timers," and generally speaking had never attended any day or evening school.

The following cases will serve as examples :—

M. A. M., aged 16. Never attended a day school, but was employed in nursing until I entered the mill, about three years since.

J. K., aged 15. I attended a day school for about six weeks.

E. R., aged 15. Never attended school with the exception of three weeks at an evening school.

H. P., aged 16. Never attended school.

E. S., aged 16. Only attended a very short time at an evening school.

M. M., aged 18. Never attended school.

A. L., aged 16. Employed a few months half time, but never attended school since.

M. S., aged 16. Attended school for less than twelve months before I was 10 years old, and was afterwards employed nursing.

The late Sir John Kincaid observed with reference to those who having received no education prior to their entering the factories have little chance of receiving any after, their weekly earnings being absorbed in the wants of their parents :

"This is an enormous social evil, which it appears " to me may be corrected by giving the parent a " direct interest in the education of his child by " establishing an educational test as a qualification for " employment, which would oblige parents to put " their shoulders to the wheel to get their children " educated."

The educational test has been adopted voluntarily at some mills, and I select the regulations at one factory formerly in my district, where the firm, Messrs. McConnell Bros., who owned all the cottages in the village, and employed the families, took a personal interest in the education of the children and provided a good school.

Regulations.

"Cressbrook children who wish to be employed in the mills *half time* must bring a certificate from the schoolmaster that they know, in arithmetic, simple addition; can read fairly in the second Irish book; and can write fairly upon the slate from the second book.

"Cressbrook children who wish to be employed in the mills *full time* must bring a certificate from the schoolmaster that they know, in arithmetic, the first four rules, both simple and compound; in English grammar, the parts of speech and their meanings; can write fairly upon paper, and are able to write well six lines from dictation; and have a fair knowledge of geography."

Of course this plan, which worked satisfactorily under the special circumstances in which Messrs. McConnell were situated, could not be carried out fully in the large manufacturing towns, and we have to consider what is obtainable. There is no reason, however, why the educational test which they established for children of 8 years of age should not be adopted generally for children of 13, and after 1871 no children be allowed to pass for full time under the age of 14 unless they can read and write, and that if at the age of 14 the child is unable to read and write, he or she should attend school for one hour each evening (except Saturdays), until 16 years of age, or such time as he or she is able to read and write. This would prove of immense benefit, and prevent parents employing their children *solely* in nursing and domestic duties without attending school up to the period of entering the factory to work full time, entirely regardless of their education.

In conclusion my suggestions are as follows :—

(1.) The repeal of the Printworks Acts, Bleaching and Dyeing Works Act, and Bleaching and Dyeing Works Extension Acts, and the placing all the works at present under those Acts under the Factory Extension Act, 1864, with such modifications as to meal hours and time for the completion of processes as may be necessary to meet the requirements of certain departments.

(2.) That the hours of labour during the first twelve months, say to January 1870, should be from 6 a.m. to 8 p.m., with half an hour for breakfast, one hour for dinner, and half an hour for tea. During the next eighteen months, say to July 1871, from 6 a.m. to 7 p.m., with half an hour for breakfast, and one hour for dinner; and that after that time 10½ be the hours of labour (as under the Factory Acts) in all cases, with power to the inspectors and sub-inspectors of factories to grant permission to work in any factory or part of a factory where it may be considered necessary from 7 a.m. to 7 p.m. instead of from 6 a.m. to 6 p.m.

(3.) That children be permitted to work full time when 13 years of age, if able to read and write, but that after July 1871 no child shall be allowed to work full time in any factory under the age of 14 unless able to read and write, and if at the age of 14 unable to read and write the child shall attend an evening school one hour each night (except Saturdays) until 16 years of age, unless previous to that age he or she shall be able to read and write.

Printworks. England. a.

59. *Letter from Mr. R. E. S. Oram* on "The Alternate Day System."

Manchester,
24th March 1868.

DEAR SIR,

Mr. H. W. LORD, in his report on finishers, hookers, &c., dated March 1863, observes, "The "alternative given by the Factory Act (7 & 8 Vict. "c. 15. s. 31.) of working children full time on every "other day, and sending them to school on each "preceding day, would obviate that difficulty,* and "considering the nature of the work and the usual "age of the hooker, would probably be preferable to "the plan generally adopted in the factories, that, "namely, of having two sets relieving each other in "the same day."

At the time of the passing of the 7 & 8 Vict. c. 15. young persons could work 12 hours per day. By the 31st section it was enacted, that if the young persons and females worked only 10 hours per day the children might work 10 hours in any one day on three alternate days of every week, provided that such child shall not be employed in any manner in the same or in any other factory on two successive days, and attend school at least five hours between 8 a.m. and 6 p.m. on the alternate days, except Saturdays.

Mr. Saunders, Her Majesty's inspector of factories, remarked in 1850, "The alternate day system is found "in many cases to work satisfactorily, and is much "approved of by teachers and managers of schools. "These will regret to find that for want of a special "provision for that purpose this system will probably "not be so extensively practised when the new "Factory Bill comes into operation as it has been "latterly. The greatest advantages have been de"rived from the alternate day system in woollen "mills, wherever situated, and in mills of all descrip"tions situated in rural districts. A change of dress "during the dinner hour, such as the other system "involves, is avoided, and where children have a "considerable distance to travel between their homes "and place of work it enables them to attend the "best school in the district of its residence instead "of being forced to go to a school in another district "simply on account of its contiguity to a factory.

"On the passing of the Act 10 & 11 Vict. c. 29., "usually called 'The Ten Hours Act,' the labour of "young persons and females was restricted to 10 hours, "but on that Act being repealed by the 13 & 14 Vict. "c. 54. young persons and females were allowed to "work 10½ hours, the result being that those who "had adopted the alternate day system and found it "work satisfactorily were obliged to give it up or "close their mills one half hour earlier than their "neighbours."

The late Mr. Leonard Horner observed, "The "inspectors, who must of course enforce the law as "it exists, had no alternative but to require that "either the young persons and women must be "restricted to 10 hours per day or the children "cease to work on alternate days. It was with great "regret that I felt myself compelled to interfere in "this way, because I was aware that I was not only "putting a stop to a system that was convenient to "the millowners but most advantageous to the chil"dren. The advantages to them are very great. "They are enabled to go clean to school; when they "work half time each day they go in their working "dresses, very often so dirty and smeared with dye "and grease that they are not only placed in disad"vantageous contrast with the other children, but "are refused admission to many schools on that "account, and thus are obliged to go to schools of an "inferior kind. They can also keep more exact to "the school hours, which the morning set of workers "are frequently unable to do and get their dinner "with any comfort. It is much to be regretted that "millowners wishing to adopt a system so manifestly "beneficial to the children should be prevented from "doing so by the unamended 31st section of the Act "of 1844 without sacrificing the advantages as to time "which the Act 13 & 14 Vict. c. 54. conferred upon "them."

Mr. Redgrave, Her Majesty's inspector of factories, has remarked, "I speak from my own knowledge and "experience of the value of the alternate day system. "An experience of 20 years in the administration of "the Factory Acts, an experience not confined to "one locality or one county, but extending to the "principal part of England and to the whole of "Scotland, enables me to look back to the period "when the alternate day system was legal and in "operation, viz., from 1848 to 1850, and to corrobo"rate their opinions,* and to state that it would still "be of value to children in many parts of England "if its legality had been continued to the present "time."

For the reasons already given none of the firms in my subdivision have adopted the alternate day system, but I would submit whether the option of adopting a plan, stated by those who had experience of its working to have been so eminently beneficial, and which certifying surgeons in my district have told me would be advantageous to the children, should not be given to the occupiers of *all* factories, and a clause inserted in any new Act that may be passed enabling them to do so.

I am, &c.

J. E. White, Esq. R. E. S. ORAM.

60. *Mr. Chadwick* (Messrs. S. Knowles and Co., calico printers, Tottington Mill, near Bury), manager. —The most regular parts of the work are the machine and the block printing. The block printers have a rule to work only from 6 till 6. They relax occasionally when work is scarce, but we cannot reckon on this.

The printing machines probably do not make overtime after 6 more than ten weeks in the year. It would be, say, for six weeks of this time till 8, and for four weeks till 9. Formerly they ran longer; but our powers of production in this part of the work are now much greater in proportion to the rest of the works than they were, and the time of work therefore so much lessened. To meet the increased production of the machines the number of dye becks was increased next, and an increase of other machinery may be needed as well as this. It is the object of a printer to increase machinery, so as to save labour and overtime; but then, if business increases too, overtime may still be needed. In the machine printing the hands are paid for their meal times, and are supposed to stop work only long enough to take their food comfortably.

The dyehouse makes considerably more overtime than any part of the works. I should say that for the last two years the dyehouse was going three-fourths of the time as late as 8 at the least, and the soaping and washing later, or till 9. The boys in the dyehouse are employed at such a variety of things that it is impossible to describe them. They are in nearly every part at one time or other, including helping at the dye becks.

We cannot in the least tell when work will come. It depends mainly on the merchant. For instance, he wants to send a large quantity of goods to a certain foreign market. He knows the latest time or ship by which they can be sent. He regulates his action (in buying his cloth) by the state of the market, and if that is falling, waits perhaps till the latest time that will allow of the order being executed, and the printer is pushed to execute it. The keener the merchant is in watching the market, the more pressure falls on the printer. Of course many printers print their own cloth, but it would be few who could buy enough for the large orders of merchants for foreign markets.

There have not been regular meal times in the

* That the morning set would be idle and the afternoon set overworked.

* The opinions of Messrs. Saunders & Horner.

bleaching part till lately, but we arrange for this now. In the finishing there is nothing in the process to make a difficulty in stopping. We should not allow the finishers or makers-up to make overtime in the meal times in a busy period, except just for a day, perhaps. It would be more loss than gain. They would stop a considerable time anyhow, and they would miss the rest which they now have.

The half-time boys are not always on the same work. There is a surplus to take the place of those at school, so that the same boy is now in one part and now in another. Their work is all so simple that any one can do it. They are sent to school when they can be best spared, not at regular times, and never for a long period at once. [Nearly 400 persons employed, about 50 of them children.—J. E. W.]

61. *James Eaton*, foreman of the hot room.—The boys here plait down from the printing machines, roll bundles up, &c. A few boys with two men do for all the machines. The machines do not stop at one time, so the boys are here all day till night. It is generally warm. I regulate the steam according to the styles of work. I send the boys to school about twice a week for one school time. They come here from 10 years old.

62. *Jonathan Schofield*, a boy in the dyehouse, stated that he left work usually at 9 and 10 p.m., most often at 10, though sometimes before 9 ; but Mr. Chadwick afterwards, in correction of this, said that the boy could not be there till 10 often, though he would sometimes, and that this and another boy would be the two latest there.

63. *Mr. James Walker* (Mr. R. Walker's, calico printer, Quarlton Vale), son of the proprietor.—The stated day here is from 6 a.m. till 6 p.m., and till 1 p.m. on Saturday. The regular meal times (an hour and a half) are taken, except in the dyehouse, where the work is continuous and the meals taken during the work. In other parts we do not find it desirable for the people to work in the meal times.

When there is full work we make on the average five rounds in a day in the dyehouse, which takes to about 8 p.m., though sometimes we can manage the five rounds by 7.30 p.m. Occasionally we may be pushed, or delays may occur, requiring the dyehouse to work later than 8, but this has not been the case, I think, within the last twelve months. The rounds differ in length, but including the necessary work between, as well as the actual dyeing, take on the average about 2½ hours; so that if we could not work the dyehouse after 6 p.m. we should have to stop at about 5.

If we put down more becks we could do the work in a shorter time, but the hands would go to places where they could work the longer hours. There are three boys in the dyehouse, the youngest now 13, but not yet passed by the doctor as a full-timer.

The dyehouse seems as if it would be unhealthy, from the quantity of steam in it, but we find less sickness there than in other parts of the works.

The drying room is the place in which children work the latest. This as a rule could be avoided by putting down another drying machine, and having more hands, though there are some things which we do not like to leave for the night without being dried first.

We have 75 block printers, but only about a quarter of these require children as teerers, the rest using spring tubs. The block printers have rules of their own not to work after 6 p.m., unless it be necessary in order to finish a piece. Some work in relays from 6 a.m. till 2 p.m., and from 2 p.m. till 10 p.m., but none of those who have teerers do so. This is an arrangement made in order to keep a larger number regularly employed. It is the only part of the work in which we ever had any relays.

Some years ago, when we were very busy, we tried working after 8 p.m., but found that it did not answer, and no more work was done. If men work till 9, except just for an odd night or so, it is too long for them.

When the machine printers, as the foreman said, were working generally till 8 p.m., the style of work which we were doing required this in order to keep the rest of the works fully employed. Since then we have put down another printing machine, and the style of work which we are now doing throws a less proportion on the machines. Thus we generally have a spare man, who can help the others in changing patterns, &c., and thus save some of the time which would otherwise be lost.

The school books are examined every week, and any child not having more than 150 hours school attendance in the past six months to his name is sent to school so as to make up something over that amount; often they have considerably more. At times some of the teerers are not wanted at all, and then we send them to school. In this way we can keep them at work when we are busy, without the necessity of sending them to school at all then.

But as a general rule we reckon to send each child three half-days in a week. One morning school counts three hours, and a whole day could only count five, so that they lose less time from work. Also the half-days are more for the benefit of the children themselves, than less frequent whole days would be.

Our method of schooling is not so good for children as that in factories. I am on the committee of a school attended by factory children, and we find from the examinations that they do nearly as well as the whole-time scholars.

If our children had to attend school for half time, like the factory children, it would not make any difficulty as to the work, but it would be some increase of cost. We get children now for 3*s.* 6*d.* a week, but we should not be able to get half-timers under 2*s.* 6*d.*, as that is what the factories, of which there are four or five near, give. At present, too, children with us get overtime money, which they cannot do in factories.

If the hours were shortened by law, we should have the advantage of knowing when our own day was ended. The risk to be faced would be that of foreign competition. On the whole it would, I think, be sufficient for the requirements of our business, if work was allowed till 8 p.m.

64. *Robert Walker*, foreman of machine printers.—Our work here generally runs in small quantities of any one kind, and thus requires frequent stoppages of the machines for changes. The changes may be of one or more of the colours only, or of the rollers also. The time lost by the stoppage depends in each case on the extent of the changes to be made. The time required for a change in colours only, is sometimes not more than a quarter of an hour, sometimes an hour, on the average not less than half-an-hour. If the rollers have to be changed as well, it may take, say, two hours before the machine can be started again.

On a change of colour, the colour boxes, rollers, and doctors have to be washed, the colours which are left unused being emptied out and saved for future use. On every change, too, however frequent, the doctors have to be whetted up, *i.e.*, the edge made smooth and even, as it is liable to become uneven by use. We do this, in order to be safe, after even the shortest run, though if we had a long run of, say, 50 double pieces, we should not stop for this purpose. Still we think it safer to whet the doctors each time that we stop, so as to avoid the risk of spoiling a piece.

This order here for 128 double pieces, gives a fair specimen of our kind of work, and the number of changes which have to be made. Of these pieces, the quantity of any one colouring is in nearly all cases five double pieces, and in none more than ten. Of these, 62 are printed with the same rollers, but require ten changes of colours. The other 66 are printed with other rollers, and require eleven changes of colour.

A run of this length, *i. e.*, five double or ten single pieces, would take on the average a quarter of an hour in passing through the machine. With some

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kinds it might be only five minutes. These times do not include accidental delays, which may occasionally arise.

From this it would appear that a machine here is standing for a longer time in the day than it is running, putting aside meal times. I should decidedly say that this is the case with the short runs and style of work which we are doing now. This machine is now, about 11 a.m., finishing an order of 95 double pieces, all in sets of five pieces each, and has been at it two whole days, with an hour's overtime last night to secure finishing it in time to-day, Saturday, when we leave at 1.

We stop the machines for meal times as near the regular hour as may be. If one man is a little later in stopping his machine he begins work again later.

If we work overtime we generally go till 8 p.m., not till 7, but lately trade has not been such as to require it much. A year or two ago we were very busy, and I should say that for a year then we hardly ever left off before 8 p.m., except Saturdays. We had styles then that wanted to go through the machine two or three times. Now we have many kinds that only require to go through once. If it was the same kind of work now that we were doing then we should require to work much the same hours as then.

None of the boys in here are under 15 or 16 years old. They would not do for us if any less. I far prefer big boys. They are handier and can help us much more, and some of the things which they have to carry are heavy.

65. *Messrs. Watson & Stark*, linen printers, Ramsbottom. (Inclosed with answers to printed form.)—In dyeing and bleaching the various operations are detached, and the time required for each varies according to the colour or the fabric. The machinery used in the cotton manufacture may be stopped at any moment without injury to the material in process, but in dyeing or bleaching, when the process is begun it must be completed or either the colours or the cloth would be injured. The machinery in our dyehouse never stops from 6 a.m. to 6 p.m., which enables us to have *four* rounds of madder dye per day (as each dye occupies $2\frac{1}{2}$ hours). If we were compelled by law to stop at 8 a.m. for breakfast, we could not enter a die before starting again at 8.30, and could then only have *one* dye before stopping at 12 for dinner, and *another* before stopping at 6 p.m., as the goods require washing before leaving them for the night, thus losing two dyes each day. As soon as the dye is entered the manual labour ceases, and the men can take their meals comfortably whilst the dyes are running by machinery. In bleaching it is also necessary to finish any process the goods may be undergoing or they would be made quite rotten. Our system of bleaching is in continuous lengths of 800 pieces (of 25 yards length) each, and in the process of running the goods through acids or chlorine they would be ruined if we stopped for breakfast or dinner. We consider 10 hours as long as a man can work advantageously, and endeavour as much as possible to work no longer, but we are frequently compelled to run the machinery in some of the departments half an hour or an hour after the others, in order to leave the goods in a safe state for the night.

66. *Messrs. Watson & Stark.* (Subsequent communication from Mr. Stark for the firm.—J. E. W.)—I enclose the abstract of the "Factory Acts Extension Act, 1867," which you left with me some short time since. The only part of the Act which would seriously affect our business is that prohibiting the employment of women after 6 p.m. We sometimes find ourselves compelled to run the machinery in some parts of the works until 8 p.m. (the machine printing room and finishing room especially), in consequence of several styles of work being more tedious to do than others, and as these two departments are those in which we employ women, it would be very inconvenient if they could not work along with the other persons in the same rooms, as we could not find others to do their work equally well. With respect to the children, we could easily supply their places with men from the other parts of the works which were not working overtime. The six women we employ are over 18 years of age, and they attend to the sewing machines. Their work is very easy, as the machines are worked by power and the women only attend to the needle. From the nature of our business their work is not continuous, and upon an average they sew 15 minutes and then have to wait the same length of time. When going round I frequently find them in those intervals amusing themselves by working crochet work or reading, and as the rooms they work in are well ventilated, I do not think it would be at all injurious to their health if allowed to work two hours overtime *occasionally*.

67. *Mr. J. F. Hill* (Mr. W. Rumney's printworks, Stubbins, near Bury), manager.—The dyeing, finishing, and making-up are the least regular parts. The printing machines run till 7 or 8 p.m. when we are busy. We count 8 p.m. our stopping time when busy, and try never to exceed it. It will not happen more than a dozen times in the year, I should say, that we should reckon to work till 9. The printing machines stop for the breakfast half-hour and the dinner hour. In the dyehouse the time of leaving off will be different in different parts. Suppose I say that it must work to a certain time, one part may finish by 7, another towards 8, and another might be half an hour later. We arrange if we can to put the long dyes in early. Our dyes take from $1\frac{1}{2}$ to $2\frac{3}{4}$ hours. We have only 10 block printers now. At times there may be many more; there have been over 70 or 80. About a third have teerers, the rest spring tubs. At all places that I know the teerers are paid by the masters. In the machine room we have a man to sew the pieces together at odd times when it is wanted. We used to have a woman for this, but prefer a man because he can do other things too. A man can do this kind of rough sewing very well. There are about 200 persons here altogether.

We pay all the foremen fixed wages, without reference to overtime or short time. This is both for our interest and theirs, and is, I believe, the general custom now. I do not know of any place where it is otherwise. If they were paid for overtime it would tend to encourage them in allowing it.

68. *John Lomax*, foreman of the dyehouse.—We reckon 8 o'clock our time to leave. Many times we have done by 6; it is an exception if it is earlier. As a rule we could manage to work between 6 and 6. That would be making four rounds. The chief part of the dyes take from two hours to two hours and twenty minutes. It would be very inconvenient to do without the boys if they had to be away for meals. We want them in the place all day from the time they come. They are no way overworked. There are 12 or 15 of them, two of them half-timers.

From what I hear I think that the men want a change in the law. I do not think that they think much about it raising the wages, or anything much except having the time at night. Personally I should prefer to leave at 6.

69. *John French*, foreman of machine boys.—There are 14 boys here, all from 10 to 13 years old. It is my place to send them to school. If I can spare them I send them for two half days a week, sometimes for four; it is scarcely ever that any miss a whole week. Some cannot read or tell the order marks on the piece ends, though most can read them.

70. *Mr. Robert Green* (Messrs. F. Steiner & Co.'s Turkey red dyers and printers, Church), managing partner.—Turkey red dyeing is the main part of our business. The whole of our cloth is dyed in this way, but we print only the smaller portion, probably not more than a third part of it. After being dyed and finished the cloth is complete and ready for sale in its plain state. Whether or not any given part of it will be printed is uncertain, and depends on the markets and the demand for printed cloth. It may remain for months before this is known. We have some now which has been lying a year finished as plain red cloth, and which will be sold thus or printed as occa-

sion may require. Only a very small part is printed before it is dyed. Throughout the bleaching, therefore, which is our first process, and, with the above unimportant exception, throughout the dyeing it is impossible to say as to any given portion of the cloth whether these processes are incidental to the printing. But even in the cases in which we do know this it is in some of the processes practically impossible to deal with the two portions separately; they must be taken together.

We exerted ourselves to obtain an exemption of Turkey red dyeing works from the Bleaching and Dyeing Works Act of 1860, on the supposition that without such an exemption our works would come under that Act, and of course in consequence of the exemption that Act does not affect us.

It would seem also that in strictness we are subject to the Printworks Act only so far as relates to the portion of our goods which are printed, and the bleaching and dyeing required for that portion. Practically, however, we have always conformed to this Act as to the whole of our business, though our legal adviser was of opinion that we were not required to do so further than related to the printing portion of our business only. We have no objection, however, to the whole of our works being treated as coming under this Act, as the limits are as wide as we require.

Turkey red dyeing is a very long and elaborate process, requiring as much as from six to eight weeks for its completion. The peculiarity consists not in the dyeing itself, but in certain processes preparatory to this. The object of these is to give the cotton as much as possible the properties of wool, and enable it to take a more brilliant colour. This is accomplished by passing it through oil, and afterwards drying it at frequent intervals in hot stoves.

In consequence of the large amount of oil which it contains, the cloth, when left to lie in heaps for any length of time, which is necessary for the process, and also when it is in the stoves, is liable to heat and take fire. The period over which the risk extends begins from the passing of the cloth through the oil, and continues for about 14 or 20 days, according to the weather. We can therefore to some extent judge at what time the risk is liable to be greatest, and be on the watch accordingly. The cloth has to be watched during the night as well as through the Sundays. On an alarm being given it becomes necessary to open out the cloth and pull it over rails to cool it. This requires a considerable amount of extra labour at such times, and it is necessary that we should be at liberty to employ it. With every care we have repeatedly had fires break out in this portion of the work. Fires have also very often been prevented bursting into flames only by moving the cloth in time. Hence it is often necessary to keep boys in this part employed beyond their usual hours, and to take boys from other parts of the work, who would otherwise be leaving early, to stay and help.

Formerly the preparation for Turkey red dyeing was performed by exposing the pieces in the open air to the action of the sun, and could only be done in the summer time. The preparation was carried on in summer and the dyeing in winter. Till very recently at any rate, if it is not the case still, this plan was carried on in some works. The time required was accordingly much longer. The change in this respect is analogous to that which has taken place in the substitution of ordinary bleaching for open air bleaching.

Our bleaching and printing are the same for all practical purposes as in ordinary printworks, *i. e.*, except as regards certain differences in the materials used.

We have enlarged the works from time to time to meet the increased requirements of the work, and are enlarging them still. The cause of the hours of work being longer in some parts than in others is, that these parts are not in proportion to the rest of the works. For instance, one part which now has to begin at 4 a.m., works the longest of any; that part will require to be increased to meet the pressure of work there.

Turkey red dyeing is a trade limited to very few establishments. Besides our own there are only two other establishments in England for Turkey red cloth dyeing, including one very lately started. The one with which I am acquainted is about a third the size of ours, and does not print.

The Turkey red dyeing has been mainly for foreign markets. Probably four-fifths of the production is sent abroad. Lately there has been a demand for certain purposes at home. Turkey red dyeing is carried on largely abroad, especially in Switzerland and Germany. The Turkey red prints of Switzerland are what compete with us most in the Indian market.

71. *William Boothman*, foreman of a department (the second preparing process, clearing after oiling).—We begin at 4 a.m. and leave off at 8.30 p.m., and are out of the place by 9. Sometimes we do not leave off till 9, and are then away by 9.30. These are the hours only for four days in the week; on Monday we work from 6 till 6, and on Saturday from 4 a.m. till 1.30 or 2. The boys are wanted to be about the place all the time, though often not actually at work. We stop for half an hour or so to change the liquor at about 10, and again at about 2, and they can get out at such times. Some are wanted then to carry things, &c. There are 22 boys, 12 of them half-timers, and three men. We cannot start all the place at once, so can do with only the big boys in the morning till 6 o'clock.

72. *Peter Chippendale*, foreman of mordant room.—Our usual time is to begin at 4 a.m., except for the short-timers and on Mondays, and to leave off at 8 p.m. We have been working till 8 for five years, I think. We never work till 9. But on Monday we begin at 6, and on Saturday give over at 2 or 3, and the boys by 12. There is half an hour or so for breakfast, an hour for dinner. Sometimes work stops for tea, or else some boys take the place of others while they get it.

We take boys from 8 years old, and have two now under 10. There are nine short-timers, and six other boys. The short-timers go to school five days in a week in each month. On those days they come here in the morning at 6 for an hour, and come back here again at 4.30 or 5 in the afternoon.

73. *John Crawshay*, foreman, mordant fixing.—We begin soon after 5 a.m., and never work later than 5 or 6 p.m. We stop for dinner about half an hour, sometimes an hour, at 12, or from that to 1 o'clock. There are 12 boys and some men.

74. *Pickup Grimshaw*, under foreman of dye-house.—There are, say, 80 boys and 20 men in here. The boys generally start about 9 or 10 years old. Work begins at 6 a.m., and goes on till 7 or 8 p.m. The younger boys watch the dyes for the first half of the three hours which each dye takes. The elder boys watch for the last half, that is when the dye is boiling and the pieces more likely to get fast. The younger boys have nothing to do the other half of their time. The boys do not come to work at all on the days on which they go to school.

75. *Edward Wilkinson*.—This is the hot watering department. The boys push the pieces with sticks as they pass into the cisterns. We begin at 5 a.m., and give over at 7 or 8 p.m. Sometimes we work till 9. The hands just take their meals, and then go on again. There are four short-time and 16 older boys, and 15 men.

76. *Enoch Crawshay*, foreman of clearing after dyeing.—We average 13½ hours work one day with another; usually from 5 a.m. till 6.30 p.m.; never later than 7. The whole time is paid for as working time, but the boys' work is constantly stopping. It does not run eight hours a day I should say; but we want them so that we can call on them at any time. All the hands under me are men, except about eight boys, and these not younger than 15 or 16.

77. *Thomas Carnie*, foreman of another depart-

ment.—The work here is passing the prints through liquors, &c. There is not much overtime. Work begins at 6 a.m., and stops at 6 or 7 p.m. The boys have intervals in this time. The machinery has to wait every now and then. There are 12 boys, six of them half-timers.

78. *James Pilkington*, foreman of making up and packing.—We have 14 girls, 10 of them half-timers, as hookers, and some elder girls and young women at other work. Their hours are from 6 a.m. till 7 p.m. They are paid for 13 hours, but stop full meal times. The youngest gets 5*s.* a week.

The children go to school about a week in a month, and always keep the 150 hours in front. When a child is going to school it comes here at 6 in the morning, goes to school at 9, and comes back here about 4.30, or as soon as it can after leaving school at 4. We give them six hours pay for this. They like this way, because they like to take the money home and get more meat. Two sets of children would be just the same for the work, but a loss to the parents. Often they are widows' children.

There are 14 women and girls at the finishing stove. They work 13 hours like those here.

79. *Messrs. F. W. Grafton & Co.*, calico printers, Broad Oak,* Accrington.—(From answers to printed form. Of nearly 1,000 persons employed only 75, or less than 8 per cent. are females, and about 150 children. The children are employed chiefly as follows, viz. :— in machine place 45, three-fourths boys ; teerers 39, two-thirds boys ; white room 18, nearly all girls ; bouk (bleach) house 12 boys; steamers 8, nearly all boys.—J. E. W.)

In some departments the usual time is seldom exceeded, while in others it is frequently, but very irregularly. We rarely exceed 9 p.m., and never 10 p.m., except in cases where two sets of hands are employed. This is very exceptional.

(1.) Yes; unavoidable. The fluctuations of demand for prints are such that orders could not be executed in time to meet the wants of the various markets, unless by largely increasing the productive power. Such capital might be unproductive during a great portion of the year, and at the same time the labour would only be partially employed. Again, a change of taste creates a demand for styles requiring much more labour, thus demanding more time to produce the same number of pieces.

(2.) From the answer to No. 1 it is evident that, if we were subject to the provisions of the Factory Act, we should be compelled to refuse all orders that could not be executed within the time allowed by the various markets, which in some seasons would be equal to one-third of the entire production, while at other times, when the demand is feeble, we should be scarcely half employed.

(3.) By regulating the average of the year so that the whole time worked should not exceed a certain number of hours per day. But we do not think such an average ought to be very stringently applied to the printing business, for it is only by a comparison of years that the fluctuations in the business could be ascertained. For example, for some time past there have been entire years when there has scarcely been any need for working overtime, while under the present demand, which may be permanent for even a year or more, we must work overtime to satisfy the demands of the various markets.

(4.) The schooling of the children employed here is arranged thus :—School one week and work three weeks. This necessitates the employment of four children to support the labour of three. If the Factory Act were in force here we should require twice the number of children, say six instead of three; and instead of working only six hours each day, it would be better to have them work each alternate full day or each alternate full week. The latter arrangement would seem to present advantages to all parties, employers, parents, teachers, and children.

Remarks.—We are of opinion that the application of the Factory Act to printworks would be found so troublesome and inconvenient that it would eventually exclude children, young persons, and females from being employed, and mechanical contrivances assisted by men would replace them. This would materially interfere with the employment of young persons, to whom our views more particularly apply than to children. Our business is of such an uncertain character in every way, that it would be quite impossible to class or compare it with manufacturing. The number of departments named in the list * will demonstrate the varying character of the business, and it is easy to conceive how a change of taste would cause more labour in one department at one time than at another, thus obliging us to work longer to produce the quantity required. It is and has been our constant study to avoid overtime, and as the taste has changed from time to time it has compelled us to increase those departments which the said change has affected in order to avoid overtime.

80. *Mr. Richard Crossley*, manager.—This is one of the largest printworks in the county, and employs nearly 1,000 persons. The works cover about 20 acres. Great enlargements and additions of different kinds have been constantly made throughout the works at very great cost in order as far as possible to avoid long hours. Of course if business increases too, the effect of these is so far lessened.

The number of printing machines in particular has been greatly increased, but that department is nevertheless the latest. [For explanation asked for as to the following sentence as returned by Mr. Crossley and here given, see letter † added below.—J. E. W.] For about four months now it has been working part of the time till 8 p.m., part till 7 p.m., and now till 6 p.m. ; and this will give the usual average until 7 p.m. It never works later than 8 p.m. The hands in this do not stop the full meal times, as they do in all other parts of the work, except the dyehouse, but only sufficient time for taking food. The machines do not stop at tea time, even when the amount of work done is not great, because when there is least to do the work is of so much more tedious a kind, and so much more time lost in changes. To change six rollers and colours takes on the average, say, an hour, not more. To change the colours only would take less. The place where the children plait down for the machines is cool compared with many, because there is a partition between it and the hot room in which the cloth is dried as it passes up from the machines. The temperature averages perhaps 70°.

The dyehouse is now working till 6.30 p.m. This allows of four sets of dyes being completed in the day. On Saturday it works generally only till 12 or 12.30, which allows of two sets.

In the last few years a great deal of time has been gained in bleaching by the introduction of high-pressure boiling, both in the ash kiers and the lime kiers. Each of these processes now takes only five hours, and so can be done by day, instead of taking 14 hours, as it did in the old plan, *i.e.*, without

* The Messrs. Grafton have another printwork in the neighbourhood, said by the manager at Broadoak to be towards a third of the size of the Broadoak establishment.—J. E. W.

* Viz. 33.—J. E. W.

† (From letter.) You are right in supposing that I referred in my statement of the time worked in the machine room to the four months preceding the time of writing. I now see that your statement was intended to refer to the four months preceding your visit here. This four months was about equally divided between 7 p.m. and 8 p.m., excepting three of the machines, which for one week worked until 9 p.m., this particular class of work being rather behind. The time since the four months previous to your visit has been, as stated, till 8 p.m., 7 p.m., and now 6 p.m. ; and the probability is that our machines are now so fitted as to get through the requisite amount of work at an average rate of working till 7 p.m. Having only recently completed our arrangements for increasing the strength of this department, it would be stated as an approximation only, that we should expect to finish at 6 p.m. for about one-third of the year. Hitherto when business has been good, we have rarely ceased working at 6 p.m., it being principally 8 p.m.—Rd. Crossley.

pressure, and when it had consequently to be done by night.

The high-pressure plan was first introduced in the works of a market bleacher, perhaps some 14 years back, but it has only come into general use in printworks within, I believe, about the last eight years or so. It must, no doubt, in time be adopted by all, as it does the work better in so much shorter time, and is more economical. In the regular course now cloth which goes in grey on, say, a Monday, comes out bleached on the Thursday following.

As regards the process of bleaching there is no difference between printworks and bleachworks, except that in printworks we are obliged to bleach better to be sure of getting out any grease, &c., in the cloth, which would dye into stains on the white ground. In the bleach house all the work stops at fixed times for the regular meals. No injury arises from that.

This is probably the largest block printing place in the country, and employs upwards of 200 block printers; but very few of these, perhaps not more than half a dozen at a time, need teerers, as the rest use spring tubs. A number of children, however, are employed in this department in waiting on the men, in the proportion, say, of one to every 15 block printers. It is doubtful whether teering machines, which are used in some cases, answer on the whole, as without care there is liable to be more lost by waste of colour than is saved in the wages of a teerer.

There is scarcely any work now done anywhere wholly by block printing, *i.e.*, without part being done by the printing machine, though there is still a little. It is only for certain old fashioned work.

France is the chief competitor of England in the print trade. The competition of other countries consists chiefly in their keeping us out from their markets by high duties. I have been employed in American printworks, and left that country only a few years ago. They have some large works, but their printing is not equal to the English. It is all machine printing.

81. *William Hindle*, foreman of machine place drying room, and ageing room.—The children in this drying place are nearly always half-timers. They come from 8 years old or soon afterwards. Five of the 24 now in here are 8 years old. The children get 4*s.* a week and overtime money besides. There are 11 at school to-day. We have been going till 8 p.m. for about three weeks now, and before then till 7, before then till 8; we have been about four months so. There are no bell times for meals. (*See No.* 80 *as to hours and meals in the machine department.*) There are some odd ones who have gone away from the work because it did not suit them, but very seldom.

82. *Mr. Bevan* (the Foxhill Bank Printing Company, calico and delaine printers, Church) manager.—I have been only a short time here. The printing machines go till 8 p.m. when we are busy, never later; we think it no benefit to run after 8 in the machine room, indeed not in any part of the work. The block printers generally do not work beyond 6 o'clock. This is their rule, but they depart from it when wished. They do not then work beyond 8. For more than 80 block printers at work last month there would be perhaps hardly a third that number of children. They would be waiting on the men, winding up, &c., and not more a dozen teering at one time. The change in the dyehouse has only been at work a month or two. The drying machine work sometimes goes till 10 p.m., but not often. It very much depends on the class of work coming from the dyehouse. The making-up room never works after 8, and oftener to 6 than to any time. The children go to school one week in four, some more. So far as I can tell, what the foreman dyer says is correct.

83. *James Mackenzie*, foreman of the dyehouse.—I have been in the dyehouse 26 years, and about half the time as foreman.

The dyes take usually from 1½ up to 2½ hours in the beck; with entering and taking out, an average round will take about three hours; it may be less or more. For three hours I allow three hours and a quarter, so as to be clear. Sometimes the hands come at 5.30., or 5 a.m., so as to finish by 6 p.m., but on the average they will be away by 5. The dyeing was very late, running, say, till 10 or 11 p.m., for three or four months in winter. But now more dye becks have been put down, and they will dye just about half as much again as they could before, and the hands be able to leave at 6. The soaping is late, and for full three months in winter has been working till 11 or 12 at night. But they are making arrangements, by putting down more soaping machines, which will be completed shortly, to avoid this; there will be half as many again. That will bring it down to about the proper proportion of hours. It will cost a good lot, but I think it will pay in the end. There is still an improvement to make at the dunging machines. The men at them grumble to see others walk off earlier.

When the alterations are complete and one thing made to keep up with another we could work the dyehouse between 6 a.m. and 6 p.m., but not to stop for meal hours. We have tried stopping part of the work at the dinner hour, but found it a loss. The men here are all in support of a ten hours bill. They want to work from 6 till 6. We have had two turn outs against working late before this increase was made. The men of course cannot get so much as when working longer, but more are employed, and they are well satisfied to work the shorter time.

It would be better for masters and men if the work was shorter, say 12 hours only. There would be better work and less damaged goods. We have no damage now to what we had before the addition already made. By gas light the men cannot see so well; they call it groping. I should like short hours better. It would be less responsibility to me. There would be more talent in the county, because the hands would have more time. When I was young I have many a time had to be up at night for the sake of learning after my work. I have done that when working after 10 at night.

It is very little matter whether we have boys. If I could choose an age I would take them from 16, not before, but older rather than under. Out of more than 50 hands, all males, in here, only two are under 16, and two more 16. I never kept boys under 16 after 10 o'clock, the law would not allow it.

84. *Caroline Yates*, age 13, tenter at a drying machine.—I come at 6 and give over at different times, sometimes at 6, sometimes later. I have stayed till 10 middling often this winter, perhaps eight or ten times; sometimes till 9. In winter 8 is the most common time.

85. *Messrs. J. Wilkinson & Co.*, calico and delaine printers and bleachers and dyers, Oakenshaw. (Answers to the printed form.)

(1.) Yes, because of the changes of styles and seasons to which we have to work, and must deliver our goods to time or suffer heavy losses.

(2.) It would curtail our productions at times when the demand for prints is good and the trade profitable, and would compel us to arrange and increase our machinery so as to dispense with the service of young children coming under the Factory Act.

(3.) That the Factory Act should apply to the women and the children who are under 13 years of age; and young persons over 13 years of age remain under the present arrangement. Owing to the irregular demand for prints it would happen during the quieter time, between the seasons, that the workpeople would be employed only a part of the week, and that without any power of the masters to alter it; it would only be just, both to the master and the workpeople, in such a case to allow them to work a little overtime during the busy seasons of the year to make up the loss of time that happens unavoidably between the seasons.

(4.) The children attending school must have not less than 150 hours of school attendance during any six months. The children are ordered to go to school

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at every opportunity, thereby securing ample school attendance beforehand which enables them to work several weeks without a break.

(5.) In the finishing and packing department the people work dinner hour three or four times a month; they are allowed time to take dinner comfortably. Any one having to work later than 6 p.m. is allowed half an hour for tea.

After carefully considering the whole question it is impossible to see how the Factory Act can be applied to the young persons over 13 years of age without greatly endangering the printing trade of the country. The foreign printers are close competitors, and would soon be able to take the lead of us during the busy seasons. Many children have their health improved by working at printworks; it is quite common for parents to take sickly children away from the factory and send them to the printworks until their health is restored.

86. *Mr. Samuel Farrer*, calico printer, Whittle-le-Woods.—Some 30 years ago I helped in taking an account of the number of calico printworks in the kingdom, with the number of printing machines and block printing tables in each. There were then 87 printworks in these three counties, viz., Lancashire, Derbyshire, and Cheshire, which is, I believe, the largest number that there has ever been. I can count offhand upwards of 20 that in my recollection have been closed and pulled down or turned to other purposes, but only three or four cases in which new printworks have been started where there were none before. Many, however, have been very much enlarged, and here and there entirely rebuilt. At that time there were several calico printworks in Ireland near Dublin. Now there are none in Ireland, but only some linen printworks near Belfast.

87. *Mr. J. F. Coupe*, manager.—(Letter.)—* * With respect to my statement, viz., "that "nineteen out of twenty printworks in Lancashire "have either failed or entirely stopped during the "last 30 years," I beg to hand you the following list of works from memory, to which I can add as many more, all of which places have either failed or have been stopped within the above-mentioned period. (List of 33 works. The statement referred to was made as showing the uncertain nature of the print trade.—J. E. W.)

88. *William Walker.*—I am now a machine printer at Messrs. Heywood, Higginbotham, and Smith's paper staining works. Before that I was in calico printworks. I was not machine printer there, but colour mixer. Colour mixers are often about the machine shop, so I saw how that work was done. I came to my present place as colour mixer, and was so for some time, till I became machine printer. The colours used for paper may look the same as those used for calico printing, but they are not. The colours will keep through the night, but it is preferred to have them fresh, so only enough is made beforehand to start with. In the calico printworks we used to go an hour earlier on Monday morning for this, but not on other days.

89. *Mr. J. Sutcliffe*, secretary of block printers in the Lancashire, &c. district. Replies as to numbers, &c.

(*1st communication.*)

(*a.*) In answer to yours, there are about 1,700 block printers in the four counties, that is to say, Lancashire, Yorkshire, Cheshire, and Derbyshire. There are about 1,570 men and 130 women. There will be about 1,400 boys and girls employed as teerers. (Mentions also others in Kent, Surrey, and Cumberland.) There are about 10 woollen shops and a great many paper shops in the four counties, where both boys and girls are employed under 14 years of age.

(*2nd communication.*)

(*b.*) Those I spoke of are not employed in paper. I can't say how many are employed in woollens, but as I stated before there are 1,700 block printers and 1,400 teerers. There are two shops who teer with machines * * but they can't teer all kinds of styles with machines. The ages of the teerers are from 8 to 13 years. I should say above nine-tenths are under 13 years. (Mentions block printing as carried on in Yorkshire, in two works in or near Leeds, and two near Huddersfield; in Cumberland, in one near Carlisle; and in Kent and Surrey, in two near London, the style of work in these being shawls and handkerchiefs.)

The block printers have decreased a little during the last 25 years, but they have increased this last three or four years.

The wages are when working by the day 4*s.* 2*d.* per day, and that is 1*l.* 5*s.* per week; those are the pattern cloth men; their work is done generally by piece work. The wages are 50 per cent. less than in 1831. The wages of teerers have increased a little.

There are some who never move about, and there are others who like those in different employments keep moving about. I know some who are 70 years old who have never moved from ——. There are some shops who have scarcely played any, and there are others who have not worked above four months in the year. That is like all other trades; some have better connexions, and therefore keep their men better employed.

The ordinary hours are from 6 a.m. to 6 p.m., but when busy from any time the master wants them. It was for about 12 months they all gave over at 6 o'clock. * * *

90. *Messrs. Stead, M'Alpin, & Co.*, calico printers, Cummersdale, Carlisle.—(Answers to printed form.)

(1.) As ours is a season business, working after 6 p.m. at times is unavoidable for reasons as follows, viz.:—

We are compelled by customers at seasons to deliver goods within a certain time, so that they may be able to sell them during the season. The demand is usually greatest during spring, and at this time we must work later than 6 p.m. to supply customers with goods in reasonable time.

If we are compelled to close our works at 6 p.m. we shall really be forced to cease working in certain departments at 4 p.m. for the following reasons, viz.:—

Goods must be hung up after some men have ceased working, for example, machine printers on fixed wage, whose day ends at 6 p.m. The goods they have printed must be hung up immediately or they would be spoiled, therefore if we close the whole of the works at 6 p.m. these men would have to cease working at 4 p.m.

Dyehouse.—Dyes ready to enter at 4 p.m.,—these would require 2½ hours to dye, therefore if obliged to close at 6 p.m. the men in this department would have to close at 4 p.m., and three sets of dyes, which is usual, could not be got out during 12 hours. Three sets of dyes are generally done by about 6 o'clock. Some kinds take two and a half hours each, but many four, and some even five. The average time will probably be two and a quarter to two and a half hours each dye. We cannot stop either dyeing or bleaching until the process is complete.

Teerers.—If made compulsory to school half time, we should be obliged to cease employing any children under 13 years, as the expense of a double set would be greater than a set of full-timers or those over 13 years.

(2.) If we are restricted supplying goods to customers they would be driven to foreign markets to get best class chintzes such as we produce. Foreign competition is very great already, and as labour in France is almost half lower in price than here it will be evident our trade would be materially injured by the admission of a larger quantity of foreign goods.

(3.) If we are allowed to work till 8 p.m. we should be satisfied, as our men could then be employed till 6 p.m., the end of their working day.

(4.) The hours children are schooled are from 9 to 12 o'clock a.m., and from 2 to 4 o'clock p.m.

(5.) We are favourable to education, and we should

be sorry to have to close our school, but if legislature prevents our employing children we shall have no other alternative.

91. *Mr. J. Stead.*—Our business is confined entirely to best class prints, chiefly furnitures, of expensive kinds, and such as are used only by the upper classes of society, and all for the home trade. It is different from the bulk of the Lancashire printing, and the greater part, fully two-thirds, of the work is done by block printing. There is one other firm in this country in much the same line as ourselves, and only one. The French are our great opponents in this line. There has been an increase in the demand for this style in the last few years.

For about half the year work is slack, and we do not require to work after 6 o'clock. For the other half, or rather less, we are busy. When we work overtime, which is for, probably, about six or seven months in the year, we generally work till 8 p.m., when working overtime (*i.e.*) not later. Occasionally to complete an order we must work later, and now and then for two or three nights till 12 or a good part of the night. This will only be with some of the hands. If a teerer is necessary, we employ one over 13. This is necessary, because if an order is not done in time it is thrown on our hands. If an order is asked for in a given time, and we could not promise it by then, our customers would take it elsewhere.

92. *John Dixon*, foreman of block printers.—February, March, and April are the pushing months with us. After midsummer we are slack. Then we begin to prepare patterns for the next spring. Before the American war we have worked with night relays, but never since then. We are pushed because people will not order their patterns till the last. If they would order things sooner we could regulate the hours easily.

Each block printer has a teerer. Tobytubs are not suitable for the best kind of work, such as that done here. If they were used the colours would not be properly defined. There are some kinds of work, however, in which the printer can do without a teerer, and spread the colour himself, *e.g.*, if there is but little pattern on the block. If there is much, it takes up several times as much colour, and it is also more important that the colours should be evenly spread, and he must have the child then to teer for him. Teerers will always be wanted for this sort of work.

After the pieces are printed and washed, they are hung up in the dry sheds to dry. After certain colours are put in by the block, *e.g.*, green, yellow, or blue, the pieces, when washed, must be hung up at once or the colours would come off (run). This way of drying suits better for our colours than drying on hot cans, as is usual in Lancashire. The pieces are hung up by boys, but only usually three to five boys are employed in it. These are the boys most liable to be kept after 6 o'clock. The time taken for drying depends entirely on the weather. In average weather a set is dried every night. We never use drying cans unless we are completely fast in sheds, as in frosty weather, and then after using cans we hang goods in shed, in order to get the goods humid, as near air drying as possible.

The children go to school as often as can be managed, generally three, sometimes four, days a week, for either a morning or an afternoon school, sometimes for both.

93. *Mr. Fredk. Andrew* (Messrs. J. Andrew & Co's., yarn bleachers, dyers, and printers, Harpurhey.)—Our business comes under three different kinds of factory law, viz., the Factory Acts, the Printworks Act, and the Bleaching and Dyeing Works Acts; and part of it, which we have have now given up and get done elsewhere, viz., Turkey red dyeing, came under no law at all, which seemed rather an anomaly.

The part which brings us under the Factory Acts is the "doubling" of the yarn, and processes connected with it. Our printing consists of two different branches, viz., skein printing and warp printing. The bleaching and dyeing of the yarn are for the most part merely incidental to our printing, and so far would be subject only to the Printworks Act; but they are not entirely confined to this purpose, so to avoid any question or difficulty we work these parts under the Bleaching and Dyeing Works Acts.

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We are by far the largest as well as the oldest established yarn and warp printers in the county, and do, probably, a third of the entire trade. The other houses are few in number, and mostly small establishments. The trade, however, as a whole, is increasing, We work on woollen and silk, as well as cotton. There are in England probably 30 skein printers and six warp printers, with a few others commencing in a small way, as is usually the case, many giving up again.

We have two separate establishments in Harpurhey, employing together in round numbers about 1,000 persons when in full work. All the work that necessarily comes under the Factory Acts is carried on in one alone. The yarn is finished there also. This consists in putting a polish on it, and making it in a fit state for printing; but it is chiefly used without being printed, being dyed black and colours, as well as in the white state. This work, as well as some other parts not necessarily falling under the factory regulations, being done in the same building as the work which does fall under them, some dissatisfaction was caused at the hours being occasionally later, and to avoid this and any question which might be raised on the point, we work the whole of that establishment under the Factory Acts.

The bleaching, dyeing, and printing are done in the other works. So far as the bleaching and dyeing are concerned we do not care to be troubled with the provisions for making up lost time, and keep no account of it; but all but the men leave work at 6 o'clock. There are so few women or boys in either that their making up time would be a matter of small importance. The bleaching and dyeing are closely connected, and some of the same hands are employed in one or the other as they are wanted.

In the printing department the hours vary with the demand, which depends very much on seasons. There are two busy seasons, lasting usually, the one for spring goods, say, from the middle of September to the middle of January, and the other, for autumn goods, say, from the middle of April to the middle of July. These seasons come early, because after the skeins or the warp have been printed here they have to be woven into cloth by the manufacturers, chiefly in what is called the Bradford trade, in which mixed materials are used. It is the case that those who manufacture our goods afterwards are subject to seasons in something the same way; but many manufacturers make plain goods in the interval. There is of course always some trade going on between the seasons, made up of early and late orders and repetitions of orders, but generally this trade can be done by working the hands that are left some four or five days a week. It may be said that we are fully occupied for about seven months, and slack for about five months in the year. Between the seasons there is difficulty in keeping the hands employed, and our number is, in fact, perhaps 200 or 300 less then. At other times there is often more than we can well do. The number of hands cannot be sufficiently increased all at once, and almost as soon as a sufficient number is reached, or soon afterwards, the demand very likely begins to fall off.

In these busy times the printing department, instead of stopping at 6, works till 8 p.m. That is the usual hour when there is any work after 6 p.m. This I consider legitimate overtime, but long enough for people to work, and I wish the business to be conducted reasonably and properly. We used sometimes to work till 10 p.m., but gave that up. Our experience is, that if people are driven and overdone, the work is not done so well. There are times still in which we may have occasion to keep a few printers at work after 10 o'clock, but in these cases, which are only

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exceptional, we put on boys over 16 in place of the younger.

The factory meal times are observed, and when there is work after 6 p.m. tea time is allowed.

There are a large number of boys in the skein printing department, perhaps 160 to 180 when busy, and towards a fourth of them half-timers. The work of most of them is to open out the skeins with their hands ready for the printers. The skein printing machines are worked by hand. They are small, and the process of printing skeins is so short, and the stoppages therefore so frequent, that steam power would not be suitable.

The warp printing is an important branch of our business here. It was formerly done by block printing. It is not a new trade, but our method is comparatively new, having been introduced by us about six years ago. The goods made from printed warps were printed by block, and were woven in hand looms; and those printed by our system are woven in power looms. The former method of preparing warps for printing was by putting them in looms, and part weaving them in *a very open* way called skeleton weaving. The warps were then printed and put again into looms, and these threads or the skeleton weaving taken out and the proper weft put in. We do away with this preparation and part weaving, simply putting the warps on to a beam as though they were to be woven, and passing them through the printing machine on to a beam again ready for weaving. The warp is passed through printing machines, and its surface printed with patterns from rollers just in the same manner as in calico printing and in paper staining. Both classes of machines are used, the pattern on the rollers being raised or engraved according to the machine in use. The warp, as it is printed, is wound off by the printing machine on to the beams, from which it is afterwards woven in a factory. These beams are sent to us by the manufacturers each time empty, and returned by us with the warp on ready for weaving. The winding and warping required for the warp printing are the same as those required for weaving, but there is no weft, and therefore no fabric. These processes are done in the same works as the doubling, and under the factory regulations. In the printing department girls are employed in "reeding" or drawing the warp with the hand into the reeds. If they were doing this up at the other works they would be under the Factory Act, but as they do not they work the two hours later when needed, and could work four hours later if we approved of that, which, as I have said, we should not.

The warp printing is very variable as to demand. In order to get through the work at all in busy times we are obliged to have a large proportion of machines beyond what are required in ordinary times, when consequently several of them are standing idle. The number of them at work will vary from 12 or 15 down to two or three. In like manner with the skein printing, at one time only about 15 to 20 machines may be going, and at another as many as 60 to 70.

Our kind of business is different from calico printing, being almost entirely done for hire. Sometimes for definite orders we buy yarn and print it, but this forms only a small part of our business. The quantity of yarn and variety of work required are so great that it would be impossible to work the business with advantage finding our own yarn as a rule. But calico printers having their own cloth can print when they please. We more resemble the ordinary bleachers. We do no calico printing.

The question of bringing such a trade as ours under the same limits as the factories or not, all resolves itself into this one point, viz., that it is a fancy trade and therefore subject to great fluctuations, and on this account I consider that we ought to be left in such a position as to be able to make a push when it is necessary. So far as the nature of the processes themselves are concerned, there is nothing which could not be brought within the factory limits.

We do not consider that in a business like ours any advantage would be gained to the working classes by curtailing the hours of work in the printing department to the factory limits. It would necessitate a proportionate increase in the number of hands, and would cause greater irregularity in their employment; for instance, we should have our full numbers if possible when we were short of work, to be ready in case of emergency, knowing that we could not make a push when required by working overtime. We consider this would affect the time made on an average perhaps a day or a day and a half less in a week to all men and boys employed.

The half-timers are sent to school, as a general rule, each for six weeks at a time, once in each half year.

The short-timers are sent to school according to the directions in the Printwork Act, and we pay the school charge.

94. *Mr. Harvey Heywood* (Messrs. Dickens & Co.'s, silk and cotton dyers and printers, Middleton).—I am the managing partner of this firm. As cotton winders we are under the Factory Act, and as printers we are under the Printworks Act.

The printing is entirely block printing, except a portion of the skein printing, which is done on machines or cut-rollers worked by hand.

The block printing is mainly on silk, either on pieces for handkerchiefs or on warp for weaving chené silks, and part also is common skein printing. The warp and the skeins are laid on a table and printed by a block exactly in the same manner as a fabric is.

The pattern printed on the warp necessarily becomes slightly disturbed in the weaving, and the result is a softening of the outlines and a richness of effect which cannot be produced in any other way. Silk so printed is called chené. This must be done by hand. Silk is too expensive to trust it to a machine for warp printing, and so few pieces are printed of the same pattern that it would not be worth while to cut rollers for it. It is enterely a season's trade, the seasons being spring and autumn almost entirely, and very limited in extent in this country, in which we are, I believe, the only silk chené printers.

For the last two years the silk trade has been in such a depressed state that we have had very little occasion for working overtime in the silk branch. If we were busy we should probably go to the full extent of the Act, but we have never done that with half-timers. If we had to work till 10 p.m. we should do it only with boys over 13. The half-timers work till 8 p.m. when we are busy, but never later.

All the boys engaged with the block printers are half-timers. When we have full work there are about 40, but now there are only about 20. In addition to a teerer the block printer at some work, such as printing bandanas or silk handkerchiefs, requires a second boy, who is called a cutlayer, whose work it is to lay a piece of cloth or paper under the end of the block at certain places, so as to "cut off" part of the pattern, which would otherwise be impressed on the silk. It takes a boy two or three weeks before he gets into his work as teerer well enough to do it properly. He has to attend to the differences of colour and understand what the man is doing and is likely to want at each step.

The cotton polishing, the effect of which is to give the thread a glossy appearance, is an important part of our work in itself, but not as regards the question of limiting the hours, as it is done by men, attended by only three or four boys, whose work is to carry the cotton to the men.

The above parts of the work are done on dry goods, and there is no process in them which could not be stopped at a fixed time. The difficulty in getting through the amount of work in a given time would be merely a question of increasing the number of hands, &c.

But it is different in the dyeing, which is a chemical process, requiring often as much as three or four hours, and which must necessarily be continuous, as otherwise the goods would be spoiled. Matching the colours also is very important, and as this can only be

done by daylight, much delay is caused in the dyeing in the short dark days of winter. When we were busy it was very common for the dyehouse to work till 8 or 9 p.m., but any work after that would be quite an exception and done entirely by men. There are 15 or 20 boys in the dyehouse, but none of them under 13 year old. The bleaching forms part of the dyehouse work, but employs only men, and very few of these. In the dyeing department we have not hitherto been under any Act. The two departments have been so separated, viz., the "printing and dyeing," that the two have not in any way interfered with each other.

We have a great objection to working after 6 p.m. if it can be helped. Besides other objections, managers cannot superintend the work so well. But it would interfere seriously with our trade if we were not allowed to work the dyehouse after that time whenever the nature of the dye requires it.

If over hours have to be worked, we think it would be desirable to limit the age at which such would be allowed, say for boys not below 16 years of age.

The half-time boys are sent to school a certain amount of time, say two days, in each week as nearly as possible; but this cannot always be done, because when we are busy they cannot be spared, at least not many of them. But there is difficulty at any time in insuring that they do go to school, though the man who has charge of this looks very carefully to it. When a boy is sent from work and told to go to school for his two days, he sometimes does not go to school at all, and we do not find this out till his school book is brought next week. In one case a boy was sent off to attend school, and did not come back to work for three weeks, when of course it was supposed that he had made up all this amount of school attendance, whereas it was found that in fact he had been simply kept at home the whole time. We cannot suggest any improvements on the present system (*i.e.*, as regards the requirement of school attendance).

95. *Charles Nicholls*, age 12, teerer.—I went to school for six weeks just before I came to work here. I went because when I asked for work here I was told that I must go to school first. I had never been at school or work before, but nursed a child at home. Before I was teerer I worked at hanging up pieces in the stove here.

96. *Messrs. J. and T. Barcroft*, woollen printers, New Church. (Answers to printed form.)

(1.) The usual hours of labour are often exceeded, not only in our works but in all other woollen printworks, and this is unavoidable for several reasons, and amongst which are the following, viz. — The peculiar nature of the work, and the fluctuations to which the trade is subject; the variety of patterns, and number of colours therein; the fact of the process of printing woollen pieces being almost invariably done by hand; some patterns and pieces taking as much as two hours longer to print them than others; and, lastly, but most important of all, the fact that every piece must, on account of the dense mass of colour put on, and the nature of the ingredients, be steamed and washed the same day, otherwise the colours on the piece would go bad, and would rot the piece in a single night only.

(2.) It is obvious, for the reasons above given, that to apply the provisions of the Factory Acts regulating the hours of labour to woollen printworks would be a great evil, if not ruinous to the trade, and would materially interfere with, if not altogether prevent, persons employed in it from taking advantage of the seasons, when the bulk of the orders are given. Certainly, the same remark might be made with regard to the calico printing trade; but carpets are not a necessity, but more of a luxury, and therefore the trade is limited, and no chance or opportunity of fulfilling every order given out should be lost.

(3.) The children working at woollen printworks are generally employed as tearers, at weekly wages, and those employed are almost invariably paid by the printer, and on account of the irregular manner in which orders for carpets are given it frequently happens that the printer does not earn as much in a week as pays his tearer. We do not think that any modification of the Factory Acts which would alter the laws by which woollen printworks are regulated is necessary. There is at present great difficulty in obtaining a sufficient number of children as tearers, and if their working hours were to be restricted to be between certain hours in the day, the hardship to the printer would be increased, because he would be prevented from availing himself of work after having waited for a piece for several hours, and perhaps days.

(4.) We always endeavour, as well as possible, to allow one day in each week for the children to attend school; but when a printer is waiting for a piece to print (as he often has to do) his tearer gets more schooling; and when trade is dull, between the seasons, the children get more schooling still, and often go to school several days in succession, and we always contrive to get the children 300 hours schooling in each year.

Any modification of the Factory Act which might be made to answer to the purpose of "*calico printing*" would in all probability *not* answer for "*woollen block printing*," the two trades being so very different.

[The replies received from most of the other employers in the same trade and neighbourhood are to much the same effect, and in parts in almost the same words as those of the Messrs. Barcroft, who are the largest employers in woollen printing in that district. But for some details, see the following, Nos. 97–104.—J. E. W.]

97. *Mr. John Barcroft.* — What we call woollen printing is that on felt, druggets, table covers, rugs, &c. There is, I should say, more of this within four or five miles round here than in the rest of England together. I believe that we are the largest house in the trade, at least in this neighbourhood. At one place elsewhere woollen printing by machine has been tried lately, say for two years, and I have seen very good looking work done by it. If that succeeds it would do away with block printing and teerers altogether in woollen printing. We print felt and druggeting. The trade has increased in the last 10 years. The greatest part of the felts go abroad. I believe that there is a place in France where this work has been started, and a few in America.

We are full of work about half the year, and very slack for a quarter. It dwindles off from September to Christmas.

The printers give over at all times from 3 to 8 p.m., generally by 6. There are generally three men, sometimes two, sometimes one, to the piece, according to the pattern. A piece is about 54 yards. An average piece takes three men four to four and a half hours, a difficult piece like this, six hours. Sometimes if a piece is very bad, it takes seven or eight hours. The cloth perhaps crumples up, and so the patterns have to be filled up. If some have a piece which takes a long time we get them a short piece to make it even. We try to get them all out as soon, and as near the same time as we can. It is better for us to do so, because we have gas and fire and steam all going.

We make the regular time for meals. We are very particular about that. Waiting an hour or so does not hurt so far as the process goes.

If a piece stands all night without being washed and steamed it is nearly sure to be spoiled, and we should have to pay for the cloth. The colours have a strong acid. An accident to the steam box lately, so that we could not use it all next day, cost us, say, 50*l.* If it had been in the summer season it would have been worse. Some might be sold, some not. The pieces as printed are hooked on frames for steaming. Sometimes in summer in pieces which take a long time to print the first end is spoiled by the heat of the sun, which dries out the liquid from the colours. Generally four or five pieces are put in to the steam box at a time. The steaming takes 20 minutes

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and is done by men, and the washing takes from 20 minutes to half an hour.

With regard to the scarcity of children, wages are altogether very high about here. There are many factories near. Seven or eight big mills have been started in seven or eight years. People only live in this narrow valley. The country close on each side of us is entirely wild uninhabited moors. It is only lately that girls have been taken to our kind of work, *i. e.*, since the cotton famine. That made people scarce and children difficult to get. The children's wages are 4*s.* or 4*s.* 6*d.*, paid work or play, and the men are fain to get them at that. I have had a man playing nearly a fortnight for want of a tear boy, though searching everywhere. As soon as the children are 13 they go off to the mills, because the mills give more than we can afford to give. There is great scarcity of half-timers for the mills too, and I have heard of some getting very high wages. Our present plan of schooling does well.

98. *Mr. G. H. Buckley*, in the office.—I see to the books of school attendance. The children attend school, I should say, on an average, in part of the year of four days a week, and in the other part of two days a week. Except when we are very busy we shut the works on Saturday and send all the children to school from 8 a.m. till 1. This plan originated here and has been generally followed at other works of the same kind near. Each Friday we send a notice round to each printer that he must clear up his work and see that his teerer attends school next day. The schoolmaster is engaged for the children from these works and a cotton factory. [The schoolmaster thought that the children attended on the average eight or nine hours each week, and that many made as good progress as the mill children.—J. E. W.]

99. *Mr. T. Jackson* (Mr. E. Rostron's, felt manufacturer and printer, Waterfoot), in charge of the works.—An average piece with three men printing it takes 3½ hours. It cannot be done quicker by putting more men on to it, as more than three cannot work at the same piece. Twelve colours is a common number. If there is only one colour one man could print a piece in two hours. The pieces average from 56 to 60 yards. When a piece is printed it must be steamed for 20 minutes, wait full 20 minutes to cool, and then be washed, which takes 20 minutes. We get on with this in the day time but it must go on after the printing stops. The steamers and washers are all men.

The work is uncertain. Some places are slack while others in the same class of work are busy. Perhaps some of the hands may be a week or more and not print a piece. We send the children who work for them to school then. Last year we worked till at least 7, sometimes later, every night for 10 months in succession. We gave over at from 7 to 8 and tried to get the printers all clear by 8 for the sake of the steamers and washers who would then be working till 10. If the orders are not completed by a certain time the people will not have them. We begin punctually at 6. The meals are regular. [Children returned as under 13 years of age, 20 boys and five girls.—J. E. W.]

The children are very hearty, much stronger than those in mills, but very rough. They want more schooling. They have improved of late. We try them sometimes. We could not get two sets; if we could it would make no difference to us. They get 4*s.* 6*d.* a week on the average.

We manufacture our felt. There is only one boy in that besides the men; but we work that part regularly the factory hours.

100. *Mr. J. Trickett*, woollen printer, Waterfoot.—The men leave off any time from 4 to 8 p.m., occasionally by 2. They very seldom work after 8 p.m., not more than two or three times in six months. It would not hurt to fix 8 as the time for leaving. It would suit as well as 10 does. We could not get them to work till 10 even when there is plenty of work. There are every day several who leave much before 6. If a man finished a piece say at 4, and I had a piece for him which he could finish by 6 or so, I should give it to him; if there was only one which he could not finish before 8 he would have to give over. The pieces on an average take three men each from two up to six hours. When we are busy we have more pieces to select from, and manage as far as we can to take what takes a long time early in the day. We try to bring all out as near the same time as possible. I print dyed cloth and baize. Part of the work is printing table cloths; with these we could give over at almost any time and leave the rest of the piece till next day without any harm. The printers are paid piece work and pay their teerers. They never work in meal times. We send out patterns at Christmas, and if they sell we get work. We used to send them out twice a year. We print at so much a yard.

We can scarcely get children. There are more printshops here now. I remember when there were none in Rossendale. I have known a printer pay his teerer 5*s.* and not get a halfpenny himself in the week, and I have known a printer play three weeks for want of a boy. A few years ago a teerer's regular price was 2*s.* 6*d.* or 3*s.* a week; now they average, I should say, 5*s.*, several get that. The half-timers in the mills here, I believe, get 2*s.* 9*d.* or 3*s.* As a rule the children go to school more than once a week. We send them any time when they can get 2½ hours.

101. *Mr. R. Schofield* (Mr. R. Hoyle's, felt manufacturer and printer, Hollin, Newchurch), manager.—The average time taken for printing a piece is two and a half or three hours. The men reckon to do three pieces in a day. If busy or doing only one or two colours they would do more. Some may be printed in an hour and a half, some take up to six hours. The average length is 58 yards. The hands come at 6 if there is work. We sometimes work till 7 or 8, but even when we are busy half have done by 6. It is very seldom that any work later than 8; there may be a few working till 9 or 10 for a few nights, *e.g.*, for patterns. We should try then to put the bigger boys from the colour shop as teerers. Part have worked till 8 for three months. When we are busy we put on more printers. The meals are regular. After the printers have done the teerers have to wash the blocks, &c. There may be 16 or 18 blocks to a piece, and that would take some time. It could not wait till next day; that would make the colour hard and fill up the holes. The men would not do it, except, perhaps, for their own children; they would rather stop work altogether. When we are busy we want to get done as soon as we can, because the steamers and washers want to get away. Suppose there were 12 pieces to be washed, and two washed at a time, this would take two hours and a half. Some kinds take longer than usual for steaming and washing, *i.e.*, if the pattern is heavy and with more colour. The pieces when steamed and washed are tentered, *i.e.*, hooked and stretched on frames in a stove house heated by steam. This is done by men in the day. Next morning the pieces are taken out and ready to be packed and sent away. The felt is manufactured on the premises.

There are generally more children from 8 to 10 years old than from 10 to 13. As soon as they are full-timers they go at once to the mills. It would not hurt to change the hour of stopping from 10 p.m. to 8, but to earlier than 8 would. We want to work till 8 for pushing orders.

102. *Messrs. Taylor and Ormrod*, woollen printers, Waterfoot.—We very seldom work till 8 p.m., and not a month in a year, probably, after 6. At pattern time occasionally some work till 9 or 10 p.m., but only part of the hands. They want their teerers too. A man could print a piece with one colour in three hours. Some pieces take up to 7 or 8 hours with three men. Certain kinds can be left off at any time. Sometimes if a piece cannot be finished in the day it has to be cut and seamed again afterwards, *e.g.*, for table cloths or rugs, the whole piece being 50 or 60 yards.

There is a scarcity of children. Most get 5*s.* a week. A few years ago they got 2*s.* 6*d.* or 3*s.* There are a good many more mills near here now.

103. *Messrs. Hindle, Gaskell, and Hargreaves*, woollen printers, Newchurch.—(From answers to printed form.)

(1.) The excess is unavoidable for the following reasons: 1st, would in many instances lose the printer half a day; 2nd, would spoil his work if not allowed to finish his piece: cannot tell to an hour or two when he begins a piece when he will finish; 3rd, work so spoiled would be pounds of loss to us, say 8*l.* to 12*l.*, according to value of piece; 4th, would be very great loss to merchants if we had not the present Act, in consequence of expedition, say steamers sailing such a date, and pieces to make and print. It must be borne in mind that the material is such as to require longer time to execute than for calicoes. This fact can be attested by merchants in London and Manchester of the highest respectability.

(2.) Would have to get two sets of children, and have very great difficulty to get one. That would well nigh stop our works; 2nd, the printers pay the children themselves; it is piece work, and the children have their wages, work or play. Sometimes the printer makes 2*l.* in one week, sometimes does not get as much as will pay the child, therefore would be a great injustice to him; 3rd, (repeats that work would be spoiled by stopping at a given hour.—J. E. W.)

(3.) The Factory Act, nor no modifications of the same, would not answer for printworks. The men start work, say, any hour from 6 in the morn to 12 at noon, are leaving work any time after 12 to 5 or 6 in the evening, when things are not busy. Could not do with a fixed hour for stopping.

104. *Alexander Davidson*, block printer.—I have been a block printer 30 years, and have worked in many shops in different places in Scotland as well as England, and on different fabrics, woollen, silk, and cotton. All kinds are uncertain in seasons. The hours are much the same. Those who are brought up in woollen printing cannot well do calico or silk, but those who can do calico or silk can more easily take to woollen. Woollen printing is coarser.

105. *Mr. Wm. Robinson*, stuff and woollen printer, Isle of Cinders, Leeds.—(From answers to printed form.)

1. Very seldom; so seldom that I have no account.

2 & 5. The time allowed by the Printworks Act of working a child after he has been at school might be shortened to three months, and three weeks school, I think, with no great inconvenience. The child would go oftener to school, and not be so liable to forget what he has learned before. But we could not get children to work half time, our trade is so fluctuating.

3. The children are asked to get a certificate from the schoolmaster previous to going to work, that they have been at (school ?) for the last six weeks, and if that is right they are set to work, and at the expiration of the six months have to go to school for another term.

106. *Messrs. E. & J. Robinson*, printers of stuff, woollens, cotton warps, &c., Brighouse, Halifax.—(From answers to printed form).

(1.) Unavoidable. It seldom occurs, only when we have a given time to execute the orders in hand.

107. *Messrs E. Firth & Sons*, woollen printers, Liversedge, Yorkshire.—(From answers to printed form. Only a few men and boys (teerers) employed. Limits, when the usual hours are exceeded, 5 a.m., 9 p.m.—J. E. W.)

Meal times. We have no instance where the regular meal time has been interfered with.

(1.) We seldom have occasion to exceed the regular hours. If we have, it is caused by the irregularity of demand for fancy manufactures being sudden and imperative.

(2.) We at present work under the Factory Act, our works being in the same yard as our woollen works. This being variable work, and men being paid piece work, it would not suit them to be restricted to regular hours of work. None under 13. work more than five hours per day.

(3.) No objection to this (more) than any other trade. In every case we have difficulty in keeping an observance of the regulations of the Act on the part of children and parents. It involves extra care in employers.

(4.) One week one portion go to school in the morning, and the others in the afternoon, the following week *vice versâ*.

108. *Letter from Mr. C. Patrick*, sub-inspector of factories for the Rochdale, &c. district.

Clough Fold, Rossendale,

Sir, Dec. 14, 1867.

* * * As you are kind enough to ask me to direct your attention to points which occur to me as important, I would name the utter worthlessness of the school clauses under the Printworks Act, and, where the processes of bleaching and dyeing are carried on under the same firm, children employed in them are subject only to the Printworks Act, however distant they may be from the printworks; the late and long hours sanctioned by the Printworks Act for the employment of women, young persons, and children, viz., from 6 o'clock a.m. to 10 o'clock p.m.; and the "Form" of the Register Book of Children.

There are some occupiers who comply with the letter of the Act by sending the children to school for the stipulated number of hours—150 in any given six months—but in such way as to be of no benefit to the child, on the contrary a positive injury. Some, on first employment, send the children to school for six consecutive weeks, thus making the 150 hours, after which they go no more for some months, except on Sundays; others send theirs a morning or an afternoon, or a whole day or days occasionally, so as to make up the 150 hours, but so irregularly that the child learns nothing, or if it does, forgets it before going again. Of course some works are better than others, but as a rule children under the Printworks Act learn nothing.

A system has been started in this neighbourhood within the last two years by the block printers, and there are many children employed in the trade, which is not absolutely illegal, but I think not in accordance with the spirit of the Act. The children are sent to school on a Saturday morning at 8 o'clock, and remain until 1 o'clock p.m., five hours school attendance being credited. It is a longer time than a child can keep its attention upon books; half an hour is said to be allowed as an interval for play. The Saturday, up to the commencement of this plan, was a holiday for the schoolmaster, children under the Factory Act not being required to attend school, and the parents of day scholars being desirous of having their children at home on that day. [Refers here to reasons for this plan.] No satisfactory reason has been given to me why children in printworks should not go to school as under the Factory Acts, and which according to the occupiers of factories, schoolmasters, and my own experience for nearly 16 years, works admirably.

The long hours from 6 o'clock a.m. to 10 o'clock p.m. are much complained of when exacted. I do not think these hours are general, but some occupiers frequently take advantage of them.

The "Form" of the Register Book of Children being alphabetical is not good to inspect, and is inconvenient to the man who keeps it. There is no reason why it should not be like the Register Book of Young Persons, the name of each child being consecutively registered.

I have not had much experience in the working of the Bleach and Dye Works Acts, *per se*, having only two bleachworks, the occupiers of which have never made complaint to me of any kind. In no dyeworks apart from printworks under me are children employed.

Yours, &c.

J. E. White, Esq. Charles Patrick.

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109. *Mr. John Marsden*, floorcloth manufacturer, Newton Heath, Manchester.—Most of the floorcloth works are in London, but there are some large works elsewhere, *e.g.*, one in Bristol, another in Scotland, &c. My own, I believe, are one of the largest in the country. None employ any great number of hands. The nature of the work requires so much space and such large buildings. For instance, in one of my works, where there are eight printers, each with a boy, and twelve framers, the printing room alone is 31½ yards long, 13 yards broad, and about 16 yards high without the roof. The framing wants still more space. We used to make overtime for an hour and a half in the day; *i.e.*, till 8 o'clock, from about May till the days got shorter again. But I did not like it. It answers better to have the work regular. If the work is pressed on, it is not of so good quality. It requires time. If the place was filled too soon, some of the cloth would have to be taken down to make room. I have more space, too, now, and can do more in the same time. People do not want their goods so much in winter, but we work on the same. We always make full time. The trade brightens up with the weather in spring. My business is both for the home and the shipping trade.

Work from 6 till 6 is the standard to which I have been trying to bring my work. I do not see that it would be much inconvenience in floorcloth works if those hours were fixed by law. It is quite a different kind of business from calico printing. If much pushed, we should make overtime again probably, but not so late as the hours allowed. The nature of the work must be much the same in other works as in mine, and the proportion of the hands about the same. I should say that my business was a fair specimen of the trade and its requirements.

I see no prospect of the character of the trade being altered. I think that the work will always require to be done by hand. I have seen an attempt at roller printing, but it is very rough. Here is a specimen. There is a plan for drying more quickly by means of hot air, but I do not think that it will be so good as the present way.

110. *Mr. Guest*, manager of Mr. Marsden's Varley Street works.—The business of this establishment is carried on in five separate works, though near together. Not more than about 30 persons are employed in any one of them, and about 120 or 130 in all together, about 30 of whom are boys, and the rest men. The works are separate, owing to so much space being required, and also it is desirable in case of fire. In the table cover part, varnish, &c. is used largely.

The carpets are made thus:—The cloth or canvas is fitted in upright frames, each 25 yards by 8 yards, our cloth being woven eight yards wide. The surface is then prepared by the framemen much in the same way as a wall is plastered, the men working with trowels, smoothing, &c. The processes require intervals, some having to be repeated several times. The whole takes from six to eight weeks generally.

The cloth so prepared is cut into any widths or lengths that are required, and these are then printed by blocks on tables. After the cloth is printed it must wait at least about three months to dry properly. The work is very regular. It is not much of a season trade. We work chiefly for orders, but we work to stock, too. The longer the cloth is kept the better it is. For the last year or two we have not made overtime, though we used to do so till 7.30 or 8 in a summer. Some of the men liked to work as long as was allowed them, at some times, but at others they would take holidays. The master thought it would be better for them to be more regular. The men do not want to work late now.

We do not want young children. Of our boys we have only about 10 or so who attend school, and shall not engage more of this age. It would be less trouble as regards the work to have two complete sets of children, because it would be convenient for printers to keep to the same teerers. Now the boys have to shift about from one to another, or perhaps a man will do withour his teerer for half a day while the boy is at school.

111. *John Haggerty*, block printer.—We drop work at 5.30, and it takes half an hour to clean up. We clean the blocks and the boys the pads. We can leave off at any time, it does not hurt the work.

I have worked in several, about seven, manufactories of this kind, in London and other places, and have known men in several others. In this trade in general it is not the custom to work overtime. The London hours are from 6 to 6. It used to be the system at some works to give over when they had a mind, sometimes as late as 8 or 9, but it has been changed of late years. It is chiefly in the table cover branch and outlying places that there is any overtime. In the trade in general the work is piece work.

Lead is used in some of the colour, but we never suffer from it.

112. *John Armstrong*, floorcloth printer (now at Mr. J. Marsden's, Manchester).—I have worked in seven or eight of the floorcloth and table cover factories in London up till last year. Boys work as teerers there, but not small ones, and no girls. The regular hours there are from 6 till 6, with meal times. Only a few places make overtime. Some men work till 7.30 or 8 in summer, but not later. The men themselves do not like working late. It is hard work. The blocks are large, and the mall which we use to strike them with is heavy. I have laid as many as 2,000 blocks in a day, but that was a great many. I think 9½ hours actual printing enough for any man.

I am now printing with a press, which I work by hand. It presses down the block on the cloth instead of the printer doing this with the mall. I think it makes better work and saves time. It is getting general in London. It was in use in America several years ago when I was there. Machinery of some kind was used for it at one place in America I believe, and I have seen the work done by it, but it was only two yards wide.

113. *Mr. John Hull*, floorcloth manufacturer, Beswick, Manchester.—The floorcloth trade in this country is carried on chiefly in London. Printing oilcloth table covers is a similar work, and done in the same works. The number of floorcloth works there some few years ago, viz., in 1856, was 34. There are other floorcloth works scattered about in different parts of England; only two, I believe, in Scotland, both at Kirkaldy; and four in Ireland, all at Dublin, only one of them large. Taking the little and the big works together I should say that there are not more than 30 persons on the average employed in each. Some of the larger employ from 50 to 100, scarcely any, I should say, more; the smaller employ down to 10 or 15. Of the London works, perhaps 12 or 15 employ upwards of 50. To employ 100 in one place would take a building as large as a spinning and weaving factory with, say, 2,000 hands.

The trade is healthy if the people keep themselves clean, but it requires cleanliness, and I insist on this. In table cover printing colours have to be rubbed on dry, and fly off. A few of these, particularly emerald green, are injurious and affect the chest and eyes, or if there is any broken skin. I have known lads elsewhere laid up so.

If we were under the Factory Act it would be a little inconvenient, because it might delay the work a little; but it would be only the loss of the time. It might happen sometimes that some work was not finished by 6. There is no other difficulty. I should not object to it. On the whole I think it would do good if the law allowed work in our trade only from 6 till 6, as in other work. All would then be on the same footing. When trade is good there is a great push made, and too many goods get thrown on the market at once. If this could not be, the trade would, I think, be more even. Large masters would have certain advantages in executing orders in a hurry, as they could afford to accumulate a greater stock, and so to push any given order. The spring trade is the best:

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buyers come then. If they find what they want hanging up, they will take it; if they do not find it, perhaps they will put off their orders till later in the year. The longer the cloth is kept the better it is, as it gets well seasoned, and so gives satisfaction. The business is one in which the returns are very slow.

A plan of drying the cloth more quickly by patent machinery is, I believe, now in use in some works. This machinery has only very lately been adapted to drying floorcloth. I have understood that this will dry in six weeks what takes many months with air drying. If so, it will quite alter the whole character of the trade, and such large places will not be required. The principle is to give pure heat. Hot air with any sulphur in would spoil the colours, and so cannot be used. We only use steam pipes enough to keep the cold and damp out in bad weather, or the cloth would not dry then at all.

My work here is a fair specimen of the employment in general. I have been in several places in London and in other works here. All are on much the same system.

114. *Richard Haggerty*, floorcloth printer.—All floorcloth printing is block printing. Machine printing has been tried, but does not suit. The work is done in the same way as in calico printing. Each printer has a boy as teerer. The boys spreads the colours with a brush on a pad or carriage. I have never seen or heard of a girl teering in floorcloth printing. As the cloth is printed we keep drawing it off the table over beams, where it is left hanging to dry. It must hang two or three months before it is fit to move, and six months is better, or more if there is room. They commonly hang from three to twelve months. In the manufacturing part of the work, which is done by men in the frames, the canvas has to have several coats laid on, and wait between each till it is dry, perhaps for days, perhaps much longer.

The usual hours in the trade are from 6 till 6; though some places used to work only from light to dark in winter, as the insurance is heavy in this trade. From 6 till 6, and till 1 on Saturday, is the system of the north, but in London we worked later on Saturday in some places, at one till 6, at another till 4. I have left London about three years. Some places there make overtime. We did so up till 9 or 10. But at others the work is quite regular from 6 till 6. The work can stop at any time without hurting the pattern.

I never knew of any injury to the health from the colours. Lead is used in some, but the colours being mixed with oil there is no vapour as in painters colours mixed with turpentine. Also, when we have new boys, we use precautions, and see that they wash.

I have been 35 years in the trade. I worked in different places in or near London, as well as here, in Manchester, and at Doncaster. The work here is a fair specimen of the others. This place is small, only two printers, and two boys as teerers, and five men in the manufacturing part. Many places have not more than 15 men and boys, and I think that 100 is as many as any place has.

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115. *Mr. E. J. Jones* (Messrs. J. Black, Drew, & Co., muslin and calico printers, Dalmonach, Bonhill), managing partner.—Our business is much of the same kind as the Lancashire print trade. I was nearly 20 years in one of the largest printworks there. The chief difference is that, like several other Scotch firms, we have some muslin printing, of which there is very little in Lancashire. This involves working stentering stoves. We have both machine and block printing, and employ nearly* 900 persons.

We have the usual Scotch hours, viz., from 6 a.m. to 6 p.m., with two hours for meals. We lose very little of this time. In the last 18 months we have not lost more than a fortnight in all, I should say. Of this, part was owing to a breakdown of machinery, and part to a flood. We seldom have stoppages from breakdowns. We keep a good look out on the machinery, and correct in time whatever requires it.

The overtime is not so much in the printing as in other parts. The printing machines make overtime probably for about two months in the year. When I came here they made more, and commonly till 8 p.m. But it was too long to run from 3 till 8 without stopping, so now they make overtime only till 7 usually, or sometimes till 7.30. If they work longer it is till 9, stopping half an hour for tea, but under a month would cover this.

The block printers on the average make overtime about six weeks in the year, and some more, but seldom more than a third or a fourth of them at the same time. I have lately given instructions that however busy we may be, they are never to work later than 7 or 7.30 p.m. without special orders from me, and we have had to delay some orders a little in consequence. My reason was that I did not like to have such small children as the teerers kept so late as they were; some are only 8 or 9 years or old. They used occasionally to work the full extent of the time, on till 9 or 10 p.m. Some of the block printers occasionally work in the meal times to avoid spoiling a piece, but only a very small portion of our work, perhaps a sixth, is of a kind ever to require this, and the men usually arrange to finish a piece by the meal hour or by 6 o'clock. Though we do not much care to have block printing in itself, still if we did not do certain styles which require it, we should lose other work too, and we could not get block printers when we wanted them unless we kept them pretty well employed.

The dyehouse works irregularly, and in all parts of it, including the washing, there are no regular meal times, but the hands have comfortable time to eat. In average work we make four rounds by 5.30 p.m., and wash up and leave by 6. When we make five rounds it takes till about 8.30 p.m., and six rounds till from 10.30 till 11 p.m. In that case any boys under 13 and the women who join the runs together and straighten the cloth are sent off at 10. The women can get enough beforehand for the men to manage without them. Last year we made six rounds a day for about a month, not every day, but say on alternate days, and occasionally for two days together. When we make six rounds we try to have some of them short, though we cannot always choose our work so as to do this, but we do it as far as we can. On the average, probably, the dyehouse works about six months till 6 p.m., and for the remainder of the year till 8.30, or the later hour for the six rounds.

The bleaching goes for two or three months till 7, very rarely after 8 or so, but the drying after bleaching goes for a month or six weeks till 9 or 10 p.m. The bulk of this part stop for regular meals.

The finishing and making up, being the last process, is often late. The women and girls in this part work for, say, six months, till either 7, 8, or 9 p.m., more commonly 7. It is quite exceptional for any to work after 9, and only happens for a night or two to get off an order.

In the stentering department, where the muslins are finished in stoves, there are upwards of a hundred females, of whom about two-thirds are girls under 18, besides men and a few boys. The little girls, of whom the youngest are about 13 years old, carry the ends of the muslin pieces down the stoves, and loose them off the frames again when dry, the elder pinning them on. If the muslin is thin one frame is dry as soon as another is filled, but if it is thick it takes longer, and the girls then wait out in the cool. The temperature of the stoves is usually about 100°. The thermometer is now a little higher in one and a little lower in another.

* The number shown in the return is more than 900.—J. E. W.

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A few women work in the engraving department, painting patterns with varnish on the copper rollers. They work regularly from 6 to 6.

There are about 50 women and girls engaged in the dyehouse and the drying connected with this department.

If all the females and boys were required to leave work at 6 o'clock it would greatly diminish the production of the whole works. The only way in which we could meet this would be by increasing our productive power, particularly by enlarging the dyehouse We are indeed enlarging this and speeding some of the machinery, partly in consequence of our having had to work so late, which we do not like, and partly we thought that there might probably be some legislation for printworks, and we wished to be more prepared for it. We are not, however, prepared to work under the Factory Act.

If we had the choice we should prefer to remain as we are. We have no objection on principle to any legislation, the only question is as to its practicability. It would require a considerable outlay to increase our plant so as to keep up our production to the present amount working only the factory hours. My experience, however, of long hours for many years in Lancashire was that they were very wearisome when long continued, as they were, without any breaks, and my personal opinion is that it would be desirable to approach the factory hours to some extent.

On the whole, if the law applied to the whole country, we might probably be able to accommodate ourselves to it without being seriously affected. We should get additional hands, and arrange so as not to lose any time, and work harder when we were pressed.

I think, however, that something beyond the factory hours might fairly be allowed to printworks, say an extra hour in the evening in the six winter months. Many of the men would as soon be at work and earning more money as at home then, and winter is the time when we are generally busiest. I consider that working till 7 is more economical than working till 8, on account of the stoppage required for a meal in the latter case, and economically I do not consider 7 any worse than 6. Also extra time might be allowed to be made by working in the meal hours occasionally.

We should find a difficulty in getting double sets of children. We find a difficulty in getting what we want now at times. There are three large Turkey red printworks near in which children are wanted as teerers, and as there is much more of that kind of work done in the summer than in the winter, we find it more difficult to get children then.

The children here used to be sent to school for five hours on Saturday, after working only a few hours. Now they generally go twice in the week, viz., on Tuesday from 3 till 6, and on Saturday from 11 till 2 To allow of this, the block printers stop work on Saturday at breakfast time, 10 a.m., and on Tuesday the printers either stop or the children's place is filled by others, some spare hands being sometimes got for the purpose. Just lately, however, from want of children, the block printers have had to stop work on Tuesday afternoon.

116. *Robert McGookin*, foreman of block printers.—Most of the teerers are from 10 to 12 years old. They get 2*s.* 6*d.* or 3*s.* a week, and leave as soon as they can get better wages. They seldom stay when they get passed as 13. Some come when they are 8 years old.

117. *Adam Sherer*, age 14.—I help at the becks in the dyehouse. I have stayed here till 11 at night, eight months ago, when we have made six rounds. It has been only a few times. I never stayed later. I have been at work here three years.

Note by *Mr. E. Jones*.—This (*i.e.* "11 at night." —J. E. W.) should be half-past 10. The dyeing is finished by this time, and it is only the washing after dyeing (done by adults), which requires till nearly 11 to finish it.

118. **Mr. Alexander Miller* (Messrs. Inglis and Wakefield, delaine, calico, and muslin printers, Busby), managing partner.—Whatever is needed for the health of the workpeople or the education of the young ought to be done.

Any legislation which may be necessary for either of these purposes is proper, and we should be the last to object to it. This is a principle about which there can be no dispute. Everything must give way to health, and education is only second in importance.

In printworks generally from the nature of the trade the hours are often long, but as far as regards our own experience we are not aware of them having injured the health of the workpeople. I do not see anywhere a heartier set of boys than those in our works.

The education of the young we consider very essential, and we desire to see a better provision made for this, though we are not prepared to suggest how this should be done. We think, however, there should be some educational test before they are employed, and this might cause parents to be more anxious to see to the education of their children at an earlier period than at present they seem to do.

It would, however, be a great mistake to legislate for printworks, forming, as they do, so important a branch of trade, in the same manner as for cotton factories. The two trades are entirely different. The print trade is entirely a fancy trade, and goods cannot be produced beforehand, but only as they are wanted. They must, as it were, catch the tide; and if they miss this, they are comparatively worthless, and can only be sold at a great loss. A printer can prepare beforehand for a season so far as to get his designs and engrave his patterns and get out his samples, but cannot go on to print his cloth till he gets orders. Plain goods always have their value, and thus can always be produced beforehand, provided that the manufacturer has capital enough, and the state of the market is such as to enable him to see a profit on them.

It is true that part of the print trade is a staple trade, viz., prints for the lower classes; but those for ladies and the upper classes are entirely a fancy trade, and also what is produced for foreign markets, which is the great bulk of our trade now.

There may be other trades with similar difficulties with which I am not acquainted, but I cannot think that there is any with like difficulties so great as those of the print trade.

Besides this, the print trade is more complex and has more various branches and processes than any which I know; owing to the variety of styles in demand at given times, which it is wholly impossible to foresee or provide for beforehand, a pressure is thrown now on one part of the works, now on another. Thus at one time the demand may be for cambrics, at another for muslins, or it may be in our case for delaines, or at one time for madder dyed, and at another time for steam goods.

The pressure and the consequent long hours which we have been subject to for a long time past has arisen from a sudden demand for a particular kind of cambrics for the home trade, while another department of our works for delaines, which is inapplicable to this kind, is comparatively idle.

Some of these kinds have different departments, plant, and processes, and one department cannot do the work of another.

The only way in which we could ensure being able to produce the required amount within the factory hours would be by increasing each department and the plant belonging to it to such an extent that for the greater part of the time it would be far in excess of what was needed and lie idle, and thus the outlay would not be remunerative, but the opposite. The number of hands also would have to be increased, and a great part of them discharged after a short time, and they would be left without employment. Thus

* Mr. A. Miller in returning this statement wrote that Mr. Wakefield had seen and agreed with it.

the result would be injurious to the workpeople as well as to the employer.

A much cheaper and better way of meeting these difficulties as they arise is by working extra hours, which increases the expense only while there is actually occasion for it, instead of permanently.

Long hours and night work are so expensive and wasteful in any trade, particularly in such a trade as ours, that they would never be resorted to unless in case of absolute necessity, and the self-interest of the employer should be a sufficient security that they will not be carried beyond this. There may, I see, be cases in which the employer is not intelligent or independent enough to see and act on this, but is almost forced to act for immediate profit, or it may be not to displease his customers.

If there is any legislation we must have elasticity enough allowed us to meet the peculiarities of our trade. We should not consider it sufficient to be allowed to work only till 8 p.m. If that compromise, which I am told has been suggested by part of the trade, were accepted, we ought to be at liberty to have the work continuous, *i.e.*, without meal times, when occasion requires. But that might be considered more open to objection than the present system, under which full meal times are commonly taken, even in busy times, except in departments in which the work is always required to be continuous.

I own that in one part of our work, viz., at the stentering stoves, the work ought not to be longer than till 8 p.m. That is the most exhausting part of our work. The stoves are not of the old kind, in which the workers are inside them; that was very objectionable. At ours they merely sit outside; still even here it is too hot for long hours.

If the cost of production were increased by any legislation, and all the trade were placed on the same footing, we might probably be able to obtain an increase of price.

France is almost the only country which produces goods which come in contact with ours in other parts of the world. We find they do compete with us in the finer class of goods both in home and foreign markets; but in the lower class of goods we cannot say they compete with us at all. The Americans produce mainly for themselves now. It is only their high tariff which keeps us out from their market.

I have been 28 years connected with the print trade, not only as managing partner at the works, but also as a producer and seller of the goods. I also had the management for some years in London of a Glasgow manufacturing warehouse for the sale of fancy woven goods, part of which were printed.

The muslin print trade of this country is almost confined to Scotland, in which it is carried on by several firms. It has increased immensely of late years, but not in greater proportion than the calico, or as we call it the cambric, print trade. From a third to a half of our own business probably is in muslins, and sometimes the proportion may be the other way. The processes are nearly all the same, but muslins require to be finished on stenter stoves. As the demand is sometimes more for one, sometimes for the other, with shorter hours we should be at a disadvantage compared with the houses in England who are only in cambrics, requiring double plants for finishing both fabrics. I do not see that having the two branches would be an advantage to us from this cause; we have both a foreign and a home trade. The demand in each varies equally.

We send out part of our muslin finishing to be done by a finisher, as some other printers do also to some extent. The irregularity of the print trade of course affects these finishers also. At one time the finisher told us that he could not undertake our goods unless we let him have them a good time beforehand, and as it happened we had printed a lot in anticipation of a home demand, and could send them; but it would not be safe to print to stock often. Such cases are entirely exceptional. We might of course do all our finishing ourselves, but this would require an outlay for stoves, &c., and this might not worth our while.

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We were and still are the leading house in this country for delaine printing, and used to be solely engaged in that branch; but lately, especially for the last two years or so, delaine printing has very much fallen off. From 1842 till 1854 we were nearly altogether in delaines printed by blocks, and had nearly 400 block printers, each with a child as teerer. With the block printing we used to do very little work in winter. The block printing ceased to be of any importance with us about ten years ago. We gradually increased our machines till they now number 22, and we discontinued block printing entirely five years ago. Our whole business, however, has greatly increased.

Delaine is printed in the same manner as cambric, but some of the other processes required for it are entirely different, and require a separate plant for them. Delaine declined, I think, to a very great extent on account of goods with woven patterns coming in, and now cambric printing seems coming in more in place of those woven fabrics. I allude here specially to home trade.

We have prepared a table showing the time worked by each department in the past year, 1867. It shows a large amount of overtime, and except in one small department scarcely any work less than full time. But it was a more than usually busy year. Some of the departments are shown as making up to five and six hours overtime more or less frequently, but this is because the full meal hours are included as overtime when work is done in them. We rarely or never work after 10 o'clock at night or before 6 o'clock in the morning, with either boys or men, except in the case of a few men whose work is necessarily night work. Till we looked at the Factory Act just lately, we were always under the impression that boys under 16 could not work at night, and acted accordingly. It is proper that they should not work later than that, and we do not wish to keep this power.

119. *Mr. John M'Adam*, manager, Busby printworks. —I am an advocate for and strongly in favour of a limitation in the hours of labour both in printworks and all other departments of labour, being convinced that such is necessary not only for the physical, but the moral well-being of the working classes. By the present system no proper time is attainable in which to recruit exhausted strength or to attend to the cultivation of the mind, both necessities of our nature.

Besides being convinced that the workpeople are injured by long continued hours of labour, I at same time believe that the employer is also injured, having to pay more for a given amount of work done in a day of 15 hours than for that done in 10 hours. I believe that ultimately the limitation of the hours of labour would be a positive benefit to employers.

The exact method and time of limitation I believe will require to be varied according to the nature of the trade or business regulated, the limitations in the Factory Act not being applicable to all, certainly not applicable to printworks. It would be little short of ruin to printers were they compelled to adhere strictly to the Factory Act as in existence. The nature of the processes in printing being more varied and more critical than in cotton spinning or weaving, will require special provision made for the peculiar nature of the business.

In printworks certain portions of the work require to be carried on continuous, no stoppage for meal hours being made. The principal departments where this is necessary are the bleaching, dyehouse (all parts), scouring, steaming and washing off. In printing department meal hours can be given, but not to an exact minute, or great loss in time and material would ensue. From the variety of style, number of pieces to print to a colouring, &c., the exact meal time cannot be kept. Our practice at present is that when a machine requires to work after the beginning of the meal hour the time is extended just so much beyond the regular time of commencing. To do otherwise would cause all the expense incurred in printing 30 pieces or 40

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pieces to be expended in printing only a portion of said pieces, perhaps not more than six or eight.

If a limitation of hours in printworks be fixed on, different regulations from the Factory Act will be necessary.

Say if fixed at a day of 12 hours, then all the departments requiring to be continuous should have the power to work from 6 a.m. to 6 p.m., no meal hours being allowed. In other departments, meal hours to be allowed, time of closing to be extended to 8 p.m. In printing or other departments where it may be necessary that a machine run a limited time into meal hour, this to be allowed, but the hands so employed to have a full hour before again commencing work, thus giving full meal hours.

If the limitation of hours be fixed at 10, then departments requiring to be continuous should still be allowed to work between the hours of 6 a.m. and 6 p.m., the work in such departments not being so oppressive as in others.

In addition to above, I should say that, as the printing trade is very fluctuating, "running in what is called seasons," printworks should have the power to make up any time lost through slackness, either by the whole work being closed or any particular department, by extending the working hours per day, such time being made up in six months, time books of the works or department being evidence of such stoppage ; this could do no harm, as no master will close his workroom even for a day except through necessity.

Some such regulation as above is necessary from the fact that, at least in Scotch printworks, various fabrics are printed which are in demand at various seasons only, and required in various quantities, causing pressure of work at times in some departments, while at other times little or nothing is doing ; this continually recurring pressure being sometimes on one class of goods, sometimes on another.

There is no doubt great irregularity as to supply of work in the print trade, but if the hours of labour were limited, *all* being on the same footing, parties in want of goods would, as far as possible, have to look before them so as to secure having them done in time, and would thereby help to regulate or steady the trade.

The practice at present is the opposite of this. Orders are often taken for delivery by certain dates that can only be kept by causing the works to go long hours. This, of course, both salesmen and merchants seem to know and take advantage of.

120. *Mr. John McAdam* (* continued).—In the dyeing processes all except washing require to be continuous, or heavy loss in damage to goods and in material would ensue. Dunging (rinsing), dyeing, soaping, clearing, &c. in this case must be continuous. Goods would be injured by stopping in any of these processes. In scouring delaines also, and in the steaming of prints, we could not stop at stated times, but only men work in the parts which could not be stopped. In these and some other parts of the work we can get an hour's work ready beforehand, and do so for meal times.

Each (printing) machine is driven by a separate engine or separate gearing on main engine shaft, and so stops or continues going independently of the others. In the finishing department the starching machines want cleaning after working a certain time, say six or eight times when working long hours, or not so often in the regular day. Each cleaning takes from half to three quarters of an hour, and we manage as far as possible that a cleaning time shall come in the bell hours, when it can be done by the men, and the time thus saved.

The women and girls in the dyehouse here only sew the pieces together. In some Scotch works they are employed in the washing part and redden or arrange the cloth, but it is wet and dirty work.

Part of the work is hot and confining. At the stentering the temperature where the women and girls work is from 70° to 80° now, and in summer no doubt is sometimes up to 90°. Formerly they used to work inside the stove, and the temperature used to be about the same as it is there now, viz., 124°. The new plan is an immense benefit to them. The work at the drying cans and in the ageing room, in both of which there are women or girls, is almost as hot. They complain more of the heat in summer. Stentering, as a rule, is only required for muslin and jacconets, rarely for calico, which only needs it for one particular finish.

So far as the mere printing is concerned there is no difference between delaine and calico as to the kind of work. The colours are of a different kind and generally more in number, viz., from one to 10, while the bulk of our calico is from one or commonly two to four ; anything over four is the exception. In delaine the colours are produced more by the mere printing on of the colour, by steaming, &c. ; no dyeing required. Previously to printing the delaine passes through processes which correspond to bleaching for calico, viz., (1) scouring ; (2) passing through a series of mangles and liquors ; (3) passing through a sulphur chamber to whiten it ; (4) washing ; (5) drying on cans ; (6) preparing or passing through a series of mangles as above ; (7) washing ; (8) drying.

The introduction of sewing machines has saved a great deal of labour and time. Such a machine as this, which is worked by a small separate engine and steam from a pipe, if it could be kept going the whole time, would do as much as 12 or 15 girls by hand, and with the necessary stopping one girl can do with it as much as three or four could by hand. Machines of this construction have not been in general use in printworks more than two or three years. In the bleaching, too, a great amount of time has been saved. We can now boil in five hours or less, instead of in 10 or 12, as on the old plan. This enables us to run the goods through on the same day instead of boiling at night.

The wages are paid here weekly on Thursday now, and weekly payment is general now in Scotch printworks. They used to be paid monthly, but that conduces very much to the credit system, which is a great evil, and we thought that paying weekly would lead to a better way of laying out their money by the workpeople. I have exerted myself to get this alteration made wherever I have been.

I was brought up in printworks, and before I was here have been engaged in two of the largest printworks in Scotland as well as in printworks in Lancashire. In Lancashire I found that we could not compete with the factories for labour as so much greater wages could be made in them.

Prints of the same kind as the French are now produced in Scotland to a greater extent than they used to be. I have been informed of one large wholesale house which now takes half its prints from a Scotch firm, though a short time ago it took only French prints, and also that prints called and sold as French are often not really French all, but printed in this country.

121. *Mr. John Heys* (Messrs. Z. Heys & Sons, calico printers, Barrhead), principal managing partner.—We employ upwards of 500 persons. Our business is entirely job printing, as it is called, *i.e.*, done for hire. We are, therefore, in the same position as bleachers as regards the control of our work. We cannot see beforehand and regulate our work like printers who print their own cloth. Several of the Scotch firms, including one of the largest, are job printers like ourselves. The general custom in Scotland is for job printers to have nothing to do with getting up the styles and patterns, but to be furnished with the copper rollers by their customers.

We are powerless to avoid working beyond the regular hours when busy. The hours vary in the different departments. The statements of the foreman dyer and the foreman of the stenter stove give a fair account of those parts of the work. These

* This statement (No. 120) being confined chiefly to details, Mr. McAdam, in returning it, supplied the preceding (No. 119), as embodying his general views.—J. E. W.

two parts, however, are the most irregular, and work the longest hours. The stentering is in the muslin finishing department. We have two branches of business, cambric and muslin. The cambric finishing is sometimes late also, but not so often; I have known it working till 10 p.m. for two weeks at a time. They have been working till 9 p.m. for two weeks now, and are likely to do so for two weeks more.

The printing machines work either till 6 or till 8 p.m., never beyond that. We have found that the difference of production between working till 6 and working till 7 is very little, and so either stop at 6 or work till 8. To take the run of years, I should say that it would be about half the year till 6, and the other half till 8; last year, I think, we did not work three months till 8, but that was a very slack year. The mere printing is straightforward work, and so far as regards this we could arrange to work without overtime by putting down more machines; we have added three lately to avoid long hours. Before we did this I have known our printing work till 8 p.m. for at least nine months consecutively, except on Saturdays, when we stop at 2. We have hardly any block printing now.

By extending our works somewhat we could arrange to work under a law requiring us to stop at 8 p.m., but we should consider it a great hardship to be obliged to stop at 6.

The present system of education is not satisfactory. If a child cannot read when it comes to work, it is not likely to learn by its five hours a week school, though it may keep what it has learned. I have not thought about relays of children, and cannot judge how such a plan would work. I am interested in a cotton factory, and so far as I hear the plan works well there.

122. *John Kincaid*, foreman of the dyehouse.—Our dyes take from two hours and a quarter to two hours and a half each. We can do four rounds of two and a half hour dyes, allowing time for changes, &c., between 6 a.m. and 6 p.m. This makes our regular day's work. We have done so to-day, and are all out of the dyehouse by now, 6 o'clock,

When we do more we make five rounds. This can be done by 8 p.m. by making a push during the day. The men will take care that it is not much later than 8. When we are busy five rounds is our regular time; sometimes we make six rounds, but very seldom. Enough time could not be gained during the day to allow of six rounds being made by 10. To allow of that some of the dyes must be of a shorter kind.

The dyeing itself can go on without the boys. Their work is chiefly taking out the pieces and watching and plaiting down at machines. If we were required by law to send away the boys for meals twice a day, say for an hour and a half in all, it could be done, but they could not go at stated bell hours. They could leave at 9 for breakfast, but not just at 2 for dinner, but they could within a short time of it, say some time between 2 and 3 p.m.

123. *John Ferguson*, foreman of stenter stove.—We work, I should say, for about six months in the year till 6 o'clock only, and the other six months till 8 on the average; till 8 is our usual hour when we are busy. That is long enough, because it is hot work; it is very seldom that we work till 9. It would not be more than three weeks in the year altogether, and not more than a night or two or three nights at a time. It has been an odd night or so till 10. I do not suppose it happens four times in the year that my hands work in the regular meal time, and then they stop later for their meal. It is necessary for them in this work to stop for meal times. They could not keep on sitting here by the stove without a rest.

Where the girls are at work near the stove the temperature will be about 90°. The thermometer further off is now 80°. Inside the heat is about 140° or 150°, but girls only go in now and then, and are never in more than a few minutes at a time.

There are about 50 hands under me now. Of these only a few are men and boys; of the females 11 are children under 13, and about half the rest under 18. We could get more children if we wanted them; many come and ask for work whom we cannot take. They suit my purpose better older.

124. *Messrs. Walter Crum and Co.*, calico printers, Thornliebank. 1. The overtime occurs chiefly in subsidiary departments of these works, which, depending on changes in the kind of goods made at different times of the year, are one at one time and another at another more or less pressed. There is no rule as to the occurrence of such pressure, and it would be difficult to increase so largely each subsidiary department as to do away entirely with the need for *occasional* overtime. It is a question of the outlay of additional capital upon which the return might be very inadequate.

2. Setting aside the effect, which the legislature will doubtless keep in view, of restrictions on the print trade of this country generally as compared with foreign manufacturers, we have no doubt that partly by occasional employment of adults and partly by an increase of machinery our business could be carried on satisfactorily under provisions similar to those of the Factory Acts.

3. We think that a very desirable modification of the Factory Act, if applied to printworks, would be the power of working during *any* ten hours between 6 *o'clock* in the morning and 8 *o'clock* at night; and further, as regards the employment of children, it might be considered whether, seeing the much more healthy character of their occupations generally than those in cotton mills, it might not be made lawful to employ a child which could pass an educational test at 11 years of age instead of at 13. This would in many cases be a great relief to poor parents, while in our opinion an educational test would ensure more than the provisions of the Factory Acts as at present worked the education of the children.

4. The print trade of this country has to compete (and does so, in spite of high protective duties, more or less successfully) with the manufacturers of Prussia, Austria, Russia, Spain and Portugal, and the United States of America. I do not think that any of these countries export printed goods, although all of them now produce a great and increasing portion of what they consume.

With the French we have to compete in almost every market, for while they are the only European nation which does not import any British printed goods, their acknowledged superiority in taste enables the French printers to command the trade in goods of high quality and price consumed by the upper classes of society in this and most other countries.

Of late, too, the French printers have turned their attention to the production of commoner goods as well, and they are able to compete with us to a certain extent in many of the markets of Europe and America into which formerly none but British prints were imported.

It is fair at the same time to say that the taste of English manufacturers has so much improved that we now take some share of the trade which was before exclusively done by France.

125. *Mr. Archibald M'Intyre*, manager.—Overtime is made by women and young people till either 7 or 8 o'clock only as a rule. When they work after 8, which is only in special cases, such as at times before holidays, we give them three quarters of an hour for supper in addition to their other two hours for meals. Overtime is made for perhaps four months in a year, and it may be for two or three weeks or so at a time, but not longer. The parts in which it happens, as regards females, are chiefly in work connected with the dyeing, particularly the drying after dyeing, and in the finishing. The females in the dyehouse department are not employed in the dyeing, or at the washing machines, but in other ways. The reason of the overtime being most in these parts is that the machine power, *i.e.* the printing machines, have been in advance of the dye-

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ing and finishing departments, and therefore more work was required from the two latter. But shortly these two will be brought up equal to the rest of the works, and we expect that then very little overtime will be necessary. It is very rare in Scotland for any work to be done in meal hours, except in the dyeing department.

When we get to do without overtime it will be no disadvantage to the employers, and it will be an advantage to the workpeople. The young ones are anxious to work overtime, because they get that money for themselves.

I have always thought that an educational test for the children would be preferable to an age test. Twenty years ago, when there was block printing here, a great many children were employed, and they used to go to school two hours and a half three days each week. Since then machines have taken the place of block printing, and we have so few children that we do not keep up the old arrangement of school attendance. The children now after working four months are sent to school for the remaining two in each half year. They made good progress on the old plan. The present is not so good for them.

The kind of work in which children are engaged in our works is very light, more a recreation than labour. The health which their appearance indicates is very marked when compared with the same class of children employed in cotton factories; indeed, I have often been struck with the rapid change in the appearance of girls who had left us at the age of 13 or 14 years to work in these factories. Many of them completely lose their healthy look in the course of a few months.

[Out of nearly 1,200 persons employed in these works only 35 are children under the age of 13. —J. E. W.]

126. *Messrs. Dalglish, Falconer, & Co.*, calico printers, Campsie. [See note.*—J. E. W.]

127. *James Robertson*, foreman of the white warehouse.—There are 73 women and girls in here, only one under 13 years; 12 boys, all over 13; and 18 men. We work overtime, *i.e.*, after 6, for about a third of the year, chiefly in the winter time. The overtime in most of the work is generally till 7, very seldom till 8, never later, except in a small part of the work. I have seen us making overtime for three months together. It is very seldom that the hands lose any time. There has not been any slack time for three years. The hands are eager to make overtime. The girls begin from 3*s.* 6*d.* a week. These get 1*d.* an hour for overtime. Those at 7*s.* get 2*d.*

128. *William Partington*, foreman of bleach house. —The hands are generally gone by 5 p.m., and on Saturdays by 2. They do not work overtime, *i.e.*, after 6, for a week in the year, I should say. Before we had so much machinery we used often to work much later. The hands always stop work for the two meal hours; the engine stops. There is no inconvenience or injury done to the work by this. They used not to stop, but it was found better for them to do so. When I was away for my dinner they would not be working steadily. It is a loss to work the meal hours, I consider, in this business. The people must stop to eat anyhow, and you have to pay them for the whole time. If you work a man from 6 in the morning till 6 at night, he gets fagged, and you cannot get the work out of him. It is much better to let them go away and come back fresh. I have found this by experience. We get the work done better, and the men work cheerier.

129. *Peter Sheilds*, foreman of machine printing.— When we are busy the machines work till 7, and when we have an extra push till 8; very seldom after 8. [On this Mr. Wilson explained that it had not been till 9 for some years.—J. E. W.] For the last three months (winter) we have worked till 7 or 8. We may have another push, perhaps, in July or August. You may say that we have overtime for four months in the year on the average. It depends altogether on the fluctuation of trade. I cannot say that more machines would enable us to do with less overtime. The more we do, the more we get to do. We lose very little time indeed. Only a few of the hands lose any time at all, but (owing to the time taken in changing, &c.) the machines, one with another, are only running about two-thirds of their time. [Mr. Wilson thought "not more than half their time." —J. E. W.]

The machines all stop regularly at the meal times. If a roll is near the end then, a machine may go on a few minutes to finish it. If it is not near the end, it is divided between two of the pieces. There is a loss in that, and they generally manage to get to the end of the rolls by the meal times. A roll may have, say, from five to 100 pieces; the majority are from 20 to 25 pieces.

130. *Robert Kincaid*, foreman of dyehouse. — Part of the work starts before 6 a.m., commonly at 4, but only with men and boys over the age of 16. I know that boys over 13 might come before 6, but none do. There is no fixed hour for leaving, but in full work the ordinary time of working is till 6 or 7 o'clock. A portion work till 8 or 9; we never exceed 10, or if this is ever done for a chance time it is only with men. We never have night relays.

After dyeing the goods must be washed the same day. An hour or two will do for washing all up. The goods need not be dried the same day. The drying is done in the finishing department. There are two hours for meals, but not as to all the hands. It has always been the custom for the washing to stop work for the meal hours.

There are about 60 women and girls, all from 13 years and upwards. Their work is to attach goods for entering the machines, fold off from the washing machines, redd the goods after they come out of the dashwheels, &c. There are, say, 70 men and more than 20 boys, all over 13 years with perhaps two or three exceptions.

131. *Hugh Matheson*, foreman of cambric finishing.—There are over 90 hands in this department, most of them women and girls, and none children.

The work is very light. Our overtime is not more than two months in the year. When we make overtime it is most commonly till 8, sometimes till 7, and sometimes 9 or 10. Sometimes hands work in a meal hour, *e.g.*, to catch a train, but never in both meal hours. It is very seldom that any work in a meal hour and till 10 too on the same day.

We do with much less overtime now than we did some few years back. The machinery is speeded, and there is more of it, so we are able to get through the work much quicker. This is much better, we have more time to ourselves, and the hands earn as much. Formerly some of the work with men and boys over the age, *i.e.*, of 13, has gone after 10 o'clock, *e.g.*, till 12 or 1, and I have known it all night. [Mr. Wilson said that this was at the calenders.—J. E. W.] It is many years since I recollect any of the boys working after 10.

132. *William Shaw*, foreman of muslin finishing.— There are about 90 persons in this department, only eight of them men, and only three children under 13.

Our work is not regular. We are very busy for about three months in a year, say, from the beginning of December to the beginning of March. If we work after 6 it is generally for one, two, or more hours; I should say that this leans more to the heavier side, *i.e.*, more till 9 or 10 than till 7 or 8. We go beyond 6 at other times also, but chiefly only for a night at a time; it may be, but is not likely to be, for several nights together. Altogether it may be for a month out of the other nine. There are three or four months on the average in which we are slack, and we lose then,

* This is one of the largest Scotch printworks, employing about 1,000 persons. I regret that I am unable to represent the views of the principals, though I had an interview with one of them, Mr. Wilson, who conducted me over the works. A document prepared for the purpose was in course of being returned, but has not reached me.

I should say, a day a week for three months. There is no way of avoiding this irregularity. The work is only in muslin, and we have to prepare for the summer season. I should like it better if the work could be more regular. The girls I think like the overtime, because it helps to make up for the other time. We never work any meal hours.

When they are working overtime the hands are able to keep up to their work. We are so busy that they must do so pretty well. A great deal of our work is done by machinery, and if the machinery goes on they must keep pace with it. Some are taking pieces from machines, some drawing them over spars and examining them, some sewing, &c. None of the work is heavy; it is more monotonous than heavy. It is all healthy. I have been here 19 years.

We have the progressive finishing machines, and have had for, say, ten years. These are much better than the stationary frames. They do the work quicker, and the girls who work at them are not in the heat, as they used to be all day. Still even then there was not much ill health amongst them.

133. *William Grey*, foreman of general lapping room.—We very seldom work after 6. It has been for a few nights together in the busiest season, but perhaps not more than two weeks in a year. We try if possible to do away with over hours; we do not think them profitable. Nearly all of the hands are girls and young women.

134. *Robert Burr*, foreman of muslin lapping room.—Our work is of the same kind as in the other lapping room, but the cloth is different; ours being muslin the work is less regular. At one time we have to work for the summer season, and at another are slack. I have seen us busy for two or three months, and working then mostly till 9 or 10. The hands do not like the slack time or the overtime either, but having lost so much time they like to work to make it up.

135. *Mr. Charles Higginbotham* (Messrs. S. Higginbotham, Sons, and Gray, manufacturers and calico printers, Glasgow).—As a matter of principle we object to any interference. I do not see any occasion for altering the present Printworks Act. The people are, I believe, contented with it. The children's work is very light. We very seldom have any work after 8 o'clock, and never after 1 or 2 o'clock on Saturdays. The hands would not work later on Saturday afternoon. I do not, however, think that the trade would be injured by altering the limit to 8 o'clock instead of 10.

Our printworks here employ probably about 700 persons, and we have also a factory here where we spin and weave for own use as printers. There are other persons who are both manufacturers and printers, but we are, I believe, the only house in Glasgow who do both on the same premises. Our printing is mainly for handkerchiefs and shawls.

Lately we have been able to print by flat presses some of the work formerly done by the grounders with blocks, and which cannot be done by the cylinders. This has saved the labour of a number of women as grounders. The flat presses are worked by steam power, and are machines much of the same nature as the cylinder machines, except that the engraving is on a flat plate instead of on a roller.

We have a printwork at Kilmarnock also, but not on a large scale. There were a number of printers there, say probably 20 or 30 works including large and small, within 20 years ago, but they are now nearly extinct. The branch of trade carried on there was shawls of cotton, delaine, &c., and this has almost disappeared.

I cannot suggest any particular plan for improving the present system of school attendance. The present is better than nothing. But it is rather hard on the child to be so many hours at school at one time; being at school for five hours together, it does not get the full benefit of that time. Certainly it is not the plan which a person would choose for educating a child, if he had the choice. But I do not see when the time can be found otherwise, without having two sets of children, and there would be a difficulty in getting these. We should have no objection, as regards the work, if enough children could be got. We have no half-time children in our factory.

136. *John Ashcroft*, foreman of block printers.—We have now 75 teerers, 58 of them under the age of 13. A few come at 8 years old, most at 9 or 10. Only a few are boys. We pay the grounders' teerers wages, 2*s.* a week. The men block printers pay their own teerers, 3*s.* a week. Some have two children, one as teerer and one as "driver." The driver turns the table by putting his foot on a lever, and also lays a cut under the block to form the corner of the pattern.

Work is from 6 till 6. The overtime is chiefly in winter, for about three months. This winter the grounders worked till 8 for about two months; they scarcely ever work later. If a child at 2*s.* a week works overtime two hours a day for a week, *i.e.*, the five days, it gets a day's extra pay, *i.e.*, 4*d.* Sometimes a printer will work in a meal hour if in a hurry to finish a piece, and the teerer too, but would take the hour later on.

All the children in the works attend school every Saturday. This has always been our plan. They work till 9, and come to school from 10 till 3 or 4. I keep the school books and help teach, so I know them all. About half can read fairly well, of the other half about half can read the second and third books without spelling, and the rest spell. It is seldom that I have any stay here for so much as a year. They shift about from one print place to another. Some few girls stay on and become grounders. This year I have eight who were teerers learning to be grounders.

137. *Alexander Miller*, in the dyehouse.—I have been a foreman here nearly 20 years. The washing used to be done by dash wheels, and there was a woman to each. It was heavy work for them, and the water used to crack their hands. For about 10 years we have had washing machines in place of dash wheels. Now, instead of 26 women as there were then there are only two in the dyehouse, and six or eight boys. The women sew the pieces for the dyers. All the hands at the dyebecks are men.

The hands come at 6 a.m. and leave at 7.30 p.m. They generally get through four sets of dyes by then, and we very seldom make any more; this gives them plenty of time. We do not work later than 8 p.m. ever now. The engine stops at 2.30 for half an hour; the dyebecks stop as well as the washing machines. We arrange the dyes so that they can be finished or stop at that time. If a dye is not finished it does not much matter, unless it is nearly finished; it would hurt it to stop then. Before the new dyebecks were put down we often had to work much longer. I think that when the accommodation which is now intended is completed we shall be able to do with an hour and a half shorter. We do not like to work long hours if we can help it.

138. *Peter Maguire*, foreman of lapping room.—Our hours are from 6 a.m. till 7 p.m., with two hours meals. We sometimes work till 7.30; very seldom after 8. We are often waiting in the day for work to come up from the finishing place. I have under me 11 women and big girls and four boys. [The hours for some of the other hands are also till 7. —J. E. W.]

139. *Mr. A. Sykes Coubrough* (the Blanefield Printing Company, cambric and jacconet printers, Strathbrane).—I am one of the firm, and manage the works. We have both machine and block printing, and employ from 250 to 300 persons, according as we are more or less busy. We have the usual stated hours, viz., 6 a.m. till 6 p.m., with two hours for meals, except in the dyehouse, where there are no meal times. In the bleaching, can drying, and finishing they are also sometimes irregular, as stated further on.

The machine printing department works overtime

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for about two months in the year, generally till 8 o'clock, as they can go on till then without stopping for supper; but if they work later they must stop for supper, and so they work then till 10; till 9 would not be much advantage.

The block printers commonly stop at 6 p.m., but notwithstanding what some of them told you, they sometimes work later. They have worked till 10 p.m. for about three months within the last two years, and their teerers too. The men pay their own teerers. It is at their own choice whether they stop for meals or not. The grounders or female block printers work about three or four months in the year to what is called 8, but is really 7.30. We pay their teerers. The rest of the time they work till 6 p.m.

The dyehouse works according to the dyes. It starts in the morning at half-past 5, or really at 5.40. The boys who go to the dye vessels come then. The time of leaving off varies from 4 p.m. till 11 p.m., according to the number of rounds made. They can get three rounds done by 4 p.m., four by towards 8 p.m., and if they make a fifth it takes till about 11 p.m. This includes the washing, which follows the dyeing and takes from three quarters of an hour to an hour. Fourteen hours a day is considered standard work in the dyehouse, and I should say that taking the year round the hands in it work that on the average, *i.e.*, till about 8 p.m. Only a small portion of the work which we do requires to be dried on the same day.

The bleaching stops pretty regularly at 6 p.m., though when busy they sometimes work in the meal times, as the can driers do also.

The can drying department, which includes the drying after bleaching and the drying after dyeing, and in which there are women and girls, as also the finishing and finished warehouse, makes overtime till about 8 o'clock or to 10 o'clock for towards two-thirds of the year, *i.e.*, 7 or 8 months, I should say. The finishing warehouse makes rather the most overtime. These hands have half an hour for a meal twice a day, but sometimes they have the regular hours.

We would not object to being allowed to work only between 6 a.m. and 6 p.m., if all the trade were obliged to do the same. We consider that the trade could bear this, as there is now so large an increase of machinery. For remarks on this, see end of paper, Note A.

But we should very much object to being obliged to send the children to school more than we do now, which is twice in the week, for four hours each time, to a school which we have provided in the works.

Even this is a sacrifice to us. When the children go to school the block printers have to stop work. In other parts of the work other workers are shifted into the children's places. But, at our expense and loss, we thought that sending them only once a week was throwing away their time as well as ours. A requirement of half time attendance would press very differently in our case from what it would in many others. We employ about 50 children, which makes a large proportion of our total number. We could not get enough for two sets. There are no other works within several miles, but the population within a radius of three miles from us is only about 1,000, and scattered, and most are well enough off not to care to send their children into works, in fact could not be induced to do so.

Note A. With regard to our statement saying we would not object to works going only from 6 a.m to 6 p.m., we of course mean the machine printing department, which is the producing department; but the can drying, finishing, finished warehouse, and especially the dyeing, require to work the overtime, as mentioned in the foregoing, as the nature of the business requires extra pushes when the seasons and styles are in, and any legislative interference with which we should consider very detrimental to our interest.

It is evident also that the proposal to work only between 6 and 6 in the machine printing, if enforced, must press much more heavily on the works with a small number of machines than on the larger works, as when orders have to be particularly hurried the machines, by working overtime, can make it up. Some firms for this cause have put on a night shift to their machines, but we have generally been able to meet our requirements by working to 10 p.m.

140. *Mr. M'Indoe* (Messrs. Glen, M'Indoe and Hall, silk, wool, and calico printers, Barrhead).—Our printing is chiefly flannel for shirts, &c., with some silk and calico printing also. The printing is the same for flannel as for the other materials, but some of the other processes are different. The silk is all printed by block, or by flat presses worked by power. Flannel printing is a more fancy trade than calico printing, and fluctuates more. There is no doubt of this. There are two seasons for it, in spring and autumn, for summer and winter use. We are the only (*i.e.* flannel—J. E. W.) printers in Scotland. The chief other house in this branch of printing is near London.

We work till 8 p.m. for about a third of the year, except the block printers, who will not work after 6 p.m. It would be inconvenient to us to have to stop work at 6 always, but I think that till 8 p.m. is as late as any one ought to work.

The children, of whom we have 30 or 40, go to school for five hours every Saturday. It would be far better if we were allowed to give them an hour's schooling every night instead. We could not get two sets of children. We have great difficulty in getting one. We employ about 200 people altogether.

141. *Messrs. A. Blair & Co.*, calico printers, Maryhill.—(Answers to the printed form. About 70 children out of nearly 300 persons employed.—J. E. W.)

The only department where we work extra time* is in the finishing room, to get goods for the various shipments.

1. Yes. We consider the trifling excess mentioned above (limit given as 8 p.m. for 12 to 20 days in the year—J. E. W.) is unavoidable, because by doing this we get our shipments ready to catch the vessels.

2. The Factory Act would not suit us at all, inasmuch as it would never do for our trade to have relays of workers to complete the day's shift. This would be quite unsuitable for our purpose, and could never succeed with such an arrangement.

4. We give the children five hour's teaching every Saturday by stopping work at 10 a.m. Have a teacher within the works specially paid for that purpose.

5. We consider the Act is not doing the good contemplated, and the chief objection which we have is that if a child is at the night school it does not count as school time in this Act. Now we think that the children are more benefited by this mode of teaching than by the present plan with a week's interval between the diets.

We think, further, if this were adopted, much of the inconvenience we at present feel in the working of the Act would be avoided and the risk of evasion lessened.

142. *Messrs. Archibald Orr Ewing and Co.*, cloth Turkey red dyeworks and Turkey red printworks, Levenbank.—Answers by Archibald Orr Ewing and Co. to the form of inquiries addressed to employers under Printworks Act.

By the above Act we have as Turkey red printers permission to work children, young persons, and women from 6 o'clock a.m. to 10 o'clock p.m.; but we hardly ever work either of them more than 10 hours per day, and never after the hour of 7 o'clock p.m. As the process of Turkey red printing is different from that of common calico printing, our finishing department must always be employed for some time after our printing is stopped, so that to limit our works from 6 to 6 would be tantamount to making our block printers work only nine hours per day. During the summer season for five days in the week our

* Owing to the manner in which the form is filled up, it is not clear whether this refers only to work in meal times or to extra time generally.—J. E. W.

hours are from 6 o'clock a.m. to 6 o'clock p.m. for all departments of the work; but the chlorine vat and finishing department will be from half an hour to an hour after 6 o'clock; two hours being allowed each day for meals. But on Saturdays our block printers stop at 10 o'clock a.m., in order to let the children go to school, and all departments of the work stop at 2 o'clock p.m., having one meal hour. In the winter season we never work our block printers by gaslight; they begin their work at daylight and end with daylight. In the depth of winter when the days are short the printers take their breakfast before they come to work and have dinner when they go home. When the days get a little longer in winter they have breakfast between the hours of 10 and 11 o'clock, and take their dinner when they are done with their work. All block printers are paid by piece work. The above remarks refer to grounders or female printers as well as to men. The greatest number of hands employed by us in our printworks belong to the block printing department. The style of work done prevents the possibility of its being printed by cylinder. Our hours of work and meals vary according to the season and the departments of the work. Our mechanics, summer and winter, work from 6 to 6, except on Saturday, when they work from 6 to 2, with breakfast hour from 9 to 10 and dinner hour from 2 to 3. Our masons work the same hours as above in summer, but in the winter from daylight to dark, with one meal hour. Our cylinder printers, cutters, engravers, and warehouse girls, joiners, plumbers, and coppersmiths work during the summer from 6 to 6, with breakfast from 9 to 10 and dinner from 2 to 3, and in the winter season they work from 6 to 5, with one meal hour, viz., from 10 to 11 o'clock. Our children go to school on Saturdays from 10 to 3 o'clock during the whole year, but from the 1st October to the 1st April the children and young people attend schools from 7 to 9 o'clock p.m., the children being permitted to go to any well qualified school nearest their home. We this winter had 455 children and young people belonging to our three works attending night schools under the surveillance of committees of our foremen in the different villages. We pay the school fees, and in some instances provide books gratis.

From the above statement you will observe that the Factory Act could not be made applicable to Turkey red printers, either as to the times of working or as to the manner in which children are to be educated; nor is it necessary, as the end is attained in another way without injury to the children or to our business. We may state that block printing is subject to periods of slackness, and in consequence of idleness to the workers, as we only print to order and cannot go on constantly like a cotton spinning mill or a weaving manufactory, to produce goods for stock, which they are enabled to do, as they never vary from producing the same article. But even when our people are pretty constantly employed they are not constantly confined like mill workers to the room in which they work. We may also remark that at the present time there is the greatest difficulty to get children to work as teerers, so that to introduce the half-time system of working, as in the Factory Act, would be tantamount to stopping the one half of our block printers. We admit, however, that the liberty we at present have to work our people from 6 a.m. to 10 p.m. is too long, and we would have no objection that the hours in a future Act should be reduced to from 6 a.m. to 7 p.m., with two hours for meals. We also admit that the educational part of the Printworks Act is defective, and that the power to employ children at 8 years of age is too young. We therefore would have no objections that the earliest age at which children should be permitted to be employed should be increased to 10 years, and that no child should be allowed to be employed under 13 years of age unless they can read and write, leaving the means to attain this end to the parents and employers of the children. The Factory Act is unsuitable for Turkey red printers for the reasons above given, and we therefore should be kept under a separate Act, with the modifications suggested.

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143. **Messrs. H. Monteith and Co.*, calico printers and dyers, Glasgow.—Our business consists of several branches, all concerned in the production of cotton goods. We have two separate establishments, one, the Barrowfield works, near Glasgow; the other at Blantyre, several miles off.

Our Barrowfield works consist of two departments, both on the same premises, but otherwise entirely distinct from each other and under separate managers. One of these is for dyeing Turkey red cloth, and the other for printing this cloth, and also for general calico printing. There is no distinction between these two classes of printing. Both alike are done by machine printing and by block printing, and in the same rooms and by the same persons, and on the same system in every respect. Part of what we call machine printing is done not by cylinders, but by flat presses. This mode is older than cylinder printing, but newer than block printing. Of late years the proportion of our work done by cylinders and flat presses has been increasing, and of that done by block printing diminishing, and this has saved time and labour. Much time has also been saved in another printing process, viz., the ageing after printing. For this we now employ an ageing machine, and by means of this do in 24 hours what used to take six to eight days, *i.e.*, we do it in about an eighth of the time. We have used this for the last 10 or 12 years.

There is, however, this difference in the case of Turkey red printing, either by cylinder or block, viz., that after being printed the cloth must be passed through a vat and washed. This must be done on the same day, otherwise the colours would be imperfect. This is a process which only requires a few minutes. The cloth is then hung up in air drying sheds, but it is not necessary that this should be done the same night, though it is much more convenient. When a machine is printing Turkey red cloth the printer usually stops half an hour earlier, so as to allow time for the vatting and washing. Half an hour is enough for an average quantity of work.

The reason why we retain any block printing is mainly that we cannot apply machine printing to various kinds of our work, on account of difficulties in certain kinds of fitting, production of certain colours, and other peculiarities as to sizes of handkerchiefs, shawls, scarves, &c.

The printing department, including in this the bleaching and dyeing which are incidental to it—*i.e.*, the madder and cochineal dyeing—is of course subject to the Printworks Act; but the whole of the Turkey red dyeing department is entirely free from it, and no part of this department is even visited by the factory inspector. This department includes a bleaching department, similar as regards employment to the bleaching in the printing department, though somewhat different and less complete as a chemical process.

Our Blantyre works consist of a factory, subject to the factory laws, in which we spin and weave, but only for our own use as printers and Turkey red dyers, and a Turkey red yarn dyeing department, which is exempt from any regulation.

We employ on the whole about 2,000 persons, about half at Barrowfield, viz., from 500 to 600 in the printing, and from 400 to 500 in the Turkey red dyeing; the other half at Blantyre, viz., from 400 to 500 in our factory, and from 500 to 600 in our Turkey red yarn dyeing. Men, women, young persons, and children are employed in each of these departments.

Our business is of a very general kind as regards the variety of our goods and styles. We produce largely for the home market and for all parts of the world. Our business fluctuates, as all fancy trades must, but

* The four acting partners, Messrs. J. Hannan, A. Arthur, J. Reid, and H. M. Hannan, all joined in this statement.

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its fluctuations are at no definite seasons, but depend chiefly on our orders. Owing to these fluctuations, however, we think it impossible that either our printing or our Turkey red dyeing should be carried on under the strict provisions of the Factory Act, putting aside particular difficulties which would arise in the case of the Turkey red dyeing.

We are entirely opposed to overwork. In any work such as ours long hours are against the interest of both employers and employed, and the work is both more costly and not so well done. This is a sufficient security that long hours will not be practised.

In the preparation for Turkey red dyeing the nature of the processes secures that the amount of work done on each day shall be regular, or nearly so. Goods can only be advanced one stage each day, and therefore if only the proper amount of goods is entered on the first stage, there will only be the same amount on any given day for each succeeding stage. The only way in which overwork would be possible would be if too large an amount of goods in proportion to the capabilities of the works were entered on the first stage, and then the overwork must be continued throughout each succeeding stage. This, however, is never done in our works, or, we believe, in Scotland, and ought not to be done anywhere, and if it is done it is fair that it should be prohibited. Our interest would be rather for than against prohibiting it.

The question of legislating for Turkey red dyeing was fully considered, and evidence led upon it, for some years before the Bleaching and Dyeing Works Act was passed, and the result was that Turkey red dyeing was properly exempted from that Act. There has been no material alteration in the processes or circumstances of the trade since that time.

It is true that the new or indoors process of preparation, which is independent of the weather or seasons of the year, on which the old or outdoors system is very dependent, has become more general of late years. But it cannot be applied with advantage for all sorts of goods, or of course the gain of being able to carry on the work regularly, without interruption from the seasons or the state of the weather, would be so great as to lead to the new system being universally adopted. We employ the new system for that part of our work to which it is applicable with advantage all the year round; but with the old are obliged greatly to diminish the amount of work in the winter, and in some winters to give it up altogether for a time; it may be from two to three months. Up till this year, however, the work has not been discontinued for the last five winters. When we have completed the necessary arrangements we reckon that we shall do about half our work by the old process, and half by the new. Except so far as arises from being free from interruptions from the weather, the new process is not quicker than the old; on the contrary, it takes rather longer.

Whichever process is employed it is essential that the day's work on Saturday should be as long as that on other days, otherwise the proper amount of goods cannot be put through a stage on that day, and as the stage when begun must be completed, the result would be that a whole day, and not merely part of a day, would be lost. In a factory the short day on Saturday only involves the loss of the few hours in the afternoon.

We should not object, either in the printing or in the Turkey red dyeing, to a regulation that we should not exceed a proper number of hours on any day, say twelve including meal times, with certain modifications. These would be as follows:—

First, as regards Turkey red dyeing. In this we must be allowed to work on Saturday as long as on other days; also, for other days as well as on Saturday, it would be much more convenient that the hours for beginning and leaving off should not be specified as in factories, but should be left to us to determine as circumstances and seasons might require, so long as we did not exceed the prescribed number of hours on any one day. If it is objected that this would make it more difficult to ensure that the law was observed, or would not give the workpeople the advantage of having fixed hours and knowing when their work would cease, this might be met by providing that the hour for beginning and leaving off work should not be changed oftener than twice a month, with, say, three days' notice.

As regards both the printing and the Turkey red dyeing there should be a liberty of working longer hours in order to meet an exceptional pressure of work, or unforeseen delays arising from accidents or weather, as we have in the factory in the case of water power. It would be sufficient for the legitimate requirements of the trade, and prevent any abuse, if this was limited to two hours per day for a period not exceeding one month consecutively, and not to be repeated till after an interval of a month. This would be free from the objections to a system which allows of making up time for months together, and while a great advantage to the employers, could be no hardship to the workpeople. We seldom or never work overtime for more than a month consecutively, rarely so much; and scarcely ever on any work, in which women or young people are engaged, beyond 8 p.m.

We do not consider it proper that young boys, women, and children should be worked later then 10 o'clock at night; and we quite approve of the present Printworks Act so far as it prohibits this.

As regards education, the present law is very unsatisfactory. The system in force in our spinning factory works well. We have a school of our own there, and so can arrange the times for the children attending regularly. We send the children from the Turkey red dyeworks also, as well as the elder girls who require instruction. At one time we had a school at Barrowfield of our own, to which the children were regularly sent; but some years ago we gave it up on account of our not requiring to employ so many children, and the building was appropriated to other purposes. Now that we are again employing as many children as formerly, we have no suitable building in the works that could be used as a school, and there is no good school within easy distance. If there were there would be no objection to requiring us to send the children regularly, as in our factory. But there should be a qualified teacher, and under the inspection of the Board of Education. Owing to the want of this certificates of school attendance can be improperly got for a small payment, though the children have not attended the school. There is great complaint on this ground in Glasgow.

144. *Letter from Mr. J. Reid* (referring to corrections embodied in the above).—I may here state that while quite approving of the restrictions of the Printworks Act with regard to the employment of women and children, we would still like to see some better arrangements enforced as to the education of the latter, but that is a matter that requires great consideration, and at the moment we are not prepared to propose any plan.

145. *Mr. David Crawford*, manager of the printwork department.—I am acquainted with English printworks. I know of no difference between their mode of work and the Scotch, except that here women are often employed for part of the work at which men and boys are employed there, viz., the washing in the dye house. Our washing is done by washing machines; we use dash wheels but very little now. Boys are not wanted in the dyehouse under the age of 15 or 16. The dyehouse hands, except the washers, work their meal hours, and are generally gone by 4 or 4.30 p.m. A very few come at 4.30 a.m. The washers' time is reckoned from 6 a.m. till 7 p.m., with two hours for meals, but they generally leave at 6 or 6.30. They never make any overtime. We are able to do without working overtime in the dyehouse, as this department is more than equal to what is required of it. A few years ago, it was necessary to work longer hours, and the dyehouse was enlarged to do away with this. Since then I never remember our working after 6 in the dyehouse.

There is no difficulty in stopping at the fixed meal

times either in the machine or the block printing. The hands at both always stop by them, if not a few minutes before. If the roll on a machine is not finished then, it is divided, if necessary, at the end of a piece where this is sewn on to the next. There are two boys with the man at each machine. The piece as it is printed goes into a stove heated to 240°, but the men or boys only go into that if anything gets wrong.

The block printers, including in these the grounders, or those who put on colours after the first blocker, and who are commonly women, all have teerers. There are 120 teerers, boys and girls, some from 8 and 9 years old, and nearly all under 13. The journeymen's teerers get 6*d.* a day, those of the grounders according to the grounders' pay, and those of the apprentices 4*d.* I have seen a teering machine in use, and have tried it, but it will not suit our work. We have such a variety of colours and thickenings. The temperature in the block printing rooms is about 70° on the average. The bottom room feels the warmest from the stove being there. The work, though warm, is very healthy. There is not the sickly smell as in a factory.

It is very seldom that any number of block printers work overtime at once; it would be very unusual for as many as a dozen to do so together. It may happen that for a push for an order the greater part work till 7.30 or 8 p.m. for a week or so, scarcely ever till 8.30. In a very few cases a few have worked at night, but then if teerers are wanted only big youths are taken for this work.

The finishing warehouse scarcely ever makes any overtime. It is not a dozen times in the year that the women and girls there work so late as 6.30 or 7 p.m. When at all busy we push their work a little more, and sometimes have to take some hands from other parts of the work.

Till a few months ago the children used to go to school for six weeks each at a time when it became necessary to make up their school attendance, only a few going at the same time. If they could get places here again they came back, but their places might be filled up. They are now all sent for five hours each Saturday, having worked only from 6 a.m. till 10 a.m. This, I believe, does them more good than the six weeks at once. They forgot then in the interval what they had learned six months before. Besides they did not always go to school then; we have known cases where children, when sent away to go to school for their six weeks, have gone to work elsewhere and not been to school at all, though they brought certificates. They could get one for 1*s.*

Some of the children only stay here a very short time, though some stay several years. I question very much if all that stay for a year or two get to be able to read. Of the whole number here at one time, I should say that probably half cannot read without spelling.

We could not have children only for half time. They would not come for half wages. If they would, having two sets would not hurt so far as the work is concerned.

146. *Mr. Alexander Fraser*, manager of the Turkey red dyeing department.—Our work here remains much the same as it was described by me on the former inquiry. Even in the old or outdoor process, however, the females never work after 6 p.m. now.

If the weather is bad the goods get so much less airing, that is all, and some days they get none, but are only liquored and stoved. Some of the hands, however, still come before 6 a.m. when the weather is suitable, and on Saturdays generally at 5 a.m. so as to leave early. With the indoor or new process the work is regular from 6 a.m. till 6 p.m., except on Saturday, when it is from 4.30 a.m. till about 4 p.m. In both processes all the hands generally work the full ten hours. The stoves when the workers are in them are now about 110° to 120°. The number of persons employed has considerably increased.

147. *Mr. Thomas P. Miller* (Messrs. W. Miller and Son printworks and dyeworks, Dalmarnock), managing partner.—We have three branches of work on these premises, and mixed up one with another, viz., (1) calico and Turkey red cloth printing, which is under the Printworks Act; (2) fancy or piece dyeing which is under the Bleaching and Dyeing Works Act; and (3) Turkey red yarn and cloth dyeing, which is not under any Act. We employ, when busy, upwards of 900 persons, of whom about 300 are in the Turkey red department. We have now about 700.

We print the greater part of the Turkey red cloth which we dye, but the cloth when dyed is finished, and any part of it may be sold without printing. One kind, however, the Turkey two-red style, as it is called, goes through only part of the Turkey red process before being printed, and through the remainder of it afterwards. But even in this case no part of the Turkey red process is treated as incidental to the printing or coming under the Printworks Act. Most of the Turkey red dyeworks print also.

The preparing and bleaching for the fancy dyeing fall only under the regulations of the printing department, as they are done in the same building and by the same process and persons as the bleaching for printing. There is no difference whatever in these two kinds of bleaching, except that that for the printing is carried a little further as a better white is required, because in nearly all prints there is some white shown in the patterns, or at least some very light shade.

In the fancy dyeing itself the Bleaching and Dyeing Works Act, as it happened, made no difference at all to us, as in that department we never used to work after 6 o'clock, and notwithstanding the fluctuation in the demand, can avoid doing so. This is a small part of our work.

In Turkey red dyeing we use the new process entirely for the cloth. The chief gain of this is that it is independent of the weather; also it does not require such a large quantity of cloth to be kept in store prepared as the old process does. In the latter large quantities are prepared in summer and dyed in winter.

The new process is not applicable to yarn dyeing. But for six or eight years we have exposed the yarn to the light and air under a glass-roofed shed instead of in the open air. At first we feared that the glass might make the rays too strong, and raise the temperature too much, but we find that we can keep the place quite cool by ventilation. This plan makes us independent of the weather, and enables us to work within uniform hours. It also saves us keeping an extra staff of hands, as we formerly had to do, to bring in the yarn in case of a shower, or put it out again afterwards. I do not know of any other works in which this plan is adopted. It could not be used for exposing cloth, which is spread on the ground, and would therefore require too great an extent of roofing, and so be too expensive.

More hand labour is required in yarn dyeing, and more machinery in the cloth dyeing, but otherwise there is no difference between cloth dyeing on the old process and yarn dyeing.

In the Turkey red dyeing the nominal hours are the same as a rule from year's end to year's end, viz., from 6 till 6, though on an ordinary day the people are gone by 5 or 5.30 p.m., and on Saturday they work the meal hour and leave by 4 p.m. The men come at 2 or 3 a.m. to get ready the work for the day. This, I believe, is the general custom of the trade; but none of the others ever come before 6 a.m. The delays which would necessitate our working overtime are of very exceptional occurrence, and I have seen some years without requiring to work any extra hours. When the work from some accidental cause is delayed, it is imperative that the processes should be completed that day, otherwise the goods would be liable to be injured. Likewise the portion left unfinished would devolve upon the following day, which could not be accomplished in the usual hours.

The stove work is hot, but I believe very healthy. The stove in which the women and girls are now beginning to hang the cloth is now 156°. They are in about half an hour at a time.

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We have more calico than Turkey red printing. The former is principally for garments, the latter for shawls and handkerchiefs. Both are done side by side in the same rooms, both in cylinder printing and block printing shops, and in the same way. Our block printing has very much diminished. Our full number of block printers is from 70 to 80, of whom about 20 are women. Each has a child from 9 to 12 years old as teerer, who gets from 2*s.* 6*d.* to 3*s.* 6*d.* a week.

In the printing the regular hours are from 6 a.m. till 6 p.m., and for the last twelve months we have not worked later than 6, but this was a very exceptional year. For the twelve months before we worked regularly till 8 p.m. with very little exception. In a good year there will be generally eight or nine months overtime in the printing part, and generally this is till 8 p.m. with us, though it may be sometimes till only 7. We never work past 8. We find it not profitable. If the people work faithfully till then, it is as much as we can expect. Sometimes we are compelled to work the dinner hour, but never the breakfast hour.

In the printing I include all the departments connected with it and subject to the Printworks Act. Of course sometimes more work is thrown on one than on another, *e.g.*, at one time on the dyeing and at another on the printing, but as a rule there is very little difference as to their hours. There will not be much in properly regulated works.

We have no wish to work later than 8 p.m. and not later than 6 in ordinary cases. We have tested this practically for some years. Under a former manager there used to be work in busy times till 9 or 10 p.m, but there was less work done really than with working till 8. We think that this limit should be sufficient in all cases, and that if in any it is found not to be so, it would be reasonable that the means of production should be increased in that case.

Nor do we wish to average more than 60 hours a week throughout the year. But to enable us to do this and to meet accidental emergencies we desire the liberty of working up till 8 p.m. on occasion. To prevent this liberty being abused by too frequent overwork, it might be provided that the overtime, *i.e.*, work after 6 p.m., should not exceed 24 hours in any four weeks. Judging from our past experience this would enable us to meet the emergencies such as I contemplate. We should consider it a hardship to be restricted to the factory hours without some such latitude. There is no trade that I am aware of which embodies a greater variety of processes or detail than calico printing, and in which the difficulties would be greater if the hours were arbitrarily prescribed from 6 a.m. to 6 p.m., without giving some latitude for exigencies.

The children go to school every Saturday from 10 a.m. till 3 p.m. in the works here, having left work at 9. Formerly we used to send them every day in the dinner hour, *i.e.*, from 2 till 3, but they did not make much progress so. We had some for months who could not tell the alphabet, though they must have been at school before they came to us. Also this time, being only an hour a day, did not count. For a time we sent them to the parish school, but found that often they would not really go. In some cases certificates which we found to be false were brought to us. It was notorious that there was a trade in giving such certificates. We took to having the school in our works again. They are taught by one of the clerks.

My opinion for some time past has been that there should be some educational test before children can be sent to work at all. If parents once found that their children could not get employment without reading or writing, or whatever might be the standard required, it would stimulate them to see that their children made some progress.

The charge for medical certificates has given great dissatisfaction to employers, especially of late. At present they cost 10 guineas a year, as the visits are weekly and 4*s.* each, which is the full limit of the law in our case, though we are often weeks without having any new hands to be certified. Where works are distant from one another it is reasonable to charge the full amount, but where there are such an amount of works close together as there are here, it should be the minimum of taxation instead of the maximum. It is a premium on the surgeon living at a distance from the greater part of his work. It would be a great improvement if the children and young persons could go to some duly appointed surgeon resident in the district. I am aware that another surgeon can be employed if the certificate is countersigned by a magistrate, and have heard that several employers have taken to this plan, but it is troublesome.

148. *Mr. John Anderson.*—I act as manager under Mr. Miller.

It is almost indispensable that some further school attendance for the children should be required. Many have been for years backwards and forwards between this and other works, and attending school, but yet I cannot say that they can read correctly.

In the printing dyehouse the hands always stop the breakfast hour at 9. The dyes come out by then at latest. They vary from an hour and a half to two hours and a half, not counting the entering and taking out. If a dye comes out some time before 9, still the hands working at it do not go on again till 10 o'clock, *i.e.*, after breakfast. They have the full hour at least. They work through the dinner hour. There are women in both dyehouses, especially that for printing. They "redd" the cloth, *i.e.*, pull it out even after the washing.

149. *Mr. James Millar* (Messrs. Muir, Brown, & Co., printworks and Turkey red dyeworks, Dalmarnock), manager.—It would be a great benefit to the workpeople in printworks if their hours of labour could be shortened. The hours of work are 10 hours as a rule. The works as a whole never wrought after 6 p.m. The elasticity of the present Act is required to meet the emergencies occasionally arising from the specialties of the printing trade. I have a great dislike to long hours, and do what I can to avoid them, and I am convinced that they are not profitable. Considering the amount of work which we generally have in hand, our hours here are unusually moderate. Speaking as a manager, and as entrusted with the proper execution of the work, I am bound to say that in my opinion the business of printworks could be properly and successfully carried on [if the day were limited?] as a rule to ten working hours, *i.e.*, from 6 a.m. till 6 p.m., with the two usual hours for meals, which is the rule, but it could not be carried on unless allowance of time is granted for special styles of work which the present Act gives us, and which is taken advantage of as seldom as possible.

Delays sometimes arise in the course of the day's work. These arise chiefly in the processes which follow on the dyeing, viz., the soaping, clearing, and drying. The time required for the dyeing varies with the kind of work, but can be calculated beforehand. The number of rounds which can be done in a given time is known. The number of rounds wanted in a day is merely a question of the amount of work to be produced. Sometimes we have styles of work printing, and any three of our twelve machines, working 10 hours a day, would keep our dye house fully occupied. No printwork could be carried on, if dyeing accommodation was provided, to confine this latter operation from 6 a.m. to 6 p.m. Sometimes we expect to stop at 6 p.m., but casualties arise which we cannot foresee, and which oblige us to work after 6 to save the goods from being spoiled. I cannot state precisely how long it would take to make up the delay. Also it would be very inconvenient if a stated amount of time were required for meals in the dyeing department.

The bleaching is very regular. The machine printing and the block printing also admit of being regular, more regular than dyeing and finishing.

For one season a few years ago, when we had a great pressure of work, we were obliged to work the machines very late. By late I mean that they ran till 8 and occasionally 9 o'clock at night, but never later with the same set of hands, except in the case of a single machine or so working till 10. These hours were too long, and I thought it better to work night relays, and did so.

The number of machines was then increased, and since this we have never worked later than 7. Though we are very busy now and have been working the machines for some time till 7, we do not work them longer, though we have work which would keep them employed for some time till 9 or 10 at night, as would probably be done at some places in a like case. But I am satisfied that it would not be profitable to continue for any length of time, which we never require to do.

But this increased number being able to produce more than the dyehouse, the dyehouse had to work often very late. Consequently last year a large new dyehouse was put up. This dyehouse was erected at a cost of some thousands of pounds, and for some months past it has not been fully occupied, and for the last few weeks only about half time, although the machines are working full time, viz., 10 hours. In a short time some orders may come to us which may necessitate the dyers to work extra time. As I have said, three of our machines may be printing styles which would keep the dyehouse fully occupied. Our dyehouse, from its capacity, is not fully occupied generally, and hence the necessity of some elasticity in the hours of labour in printworks to meet the irregularities in the different styles of work.

The part in which we are most pressed at present is the finishing, which includes starching and stentering on progressive frames, and calendering. The workers work outside the stoves; even here, however, I do not like the hands to work after 7, and they never do except for a night or so very occasionally, or they may work till 8 or 9 for a special purpose. If they work longer than the 10 hours it destroys their viligance during the day.

(*Statements as to the Turkey red dyeing department omitted here.*)*

The bleaching and dyeing for the two departments are carried on separately, and the Turkey red cloth is printed by the same machines and in the same block printing shop as the calico and muslin. Only a small part, however, a twelfth perhaps, of what is dyed is printed here. There are women and girls in both the the dyehouses, who sew pieces and help at the dye vessels; and there are boys also who watch and help at the dye vessels. The Turkey red part not being under the Act I do not notice the ages, but a number of the girls in this are young, several probably under 13. Altogether there are from 700 to 800 persons in the works. Of these, towards 500 are in the printing part, of whom about 100 are boys; 100 females over 18, and upwards of 100 under. (25 boys and 35 girls under the age of 13.)

With regard to education I wish to urge the necessity of requiring children to pass some proper educational test before they can be employed. I think it wrong that they should be employed before the age of 10 at all. Some have come here but little over 8, though there are few now under 9 or 10. The teerers are employed by the block printers. It would not be any hardship to require such a test; if there were it would cure itself in a few years. I have paid a good deal of attention to the matter, and questioned the children. The children of the poorest parents and of unskilled labourers, earning from 12*s.* to 18*s.* a week, are often able to read when they come here, while many of the children whose fathers are skilled labourers, earning, say, from 35*s.* to 2*l.* a week, are entirely neglected. I have found as a general rule that the reason is that in the former case the parents are frugal and temperate, and in the latter, intemperate. This shows that it is the will and not the means which keeps parents from educating their children.

The present amount of schooling here, viz., five hours on Saturday, is very little use, at least to those who cannot read when they come. Hundreds of children have passed through these works who, coming here often at 10 or 11, could not read when they were past 13 and freed from school attendance; I should say hundreds. There are, however, other large printworks near, and the children shift about from one to another.

We used to send children to school out of the works, but could not get them to go properly, so teach them in the works now. It used to be common in this neighbourhood for children to get false school certificates. We have had school certificates brought here grossly ill written and ill spelt, yet still they were certificates and satisfied the legal requirement.

A system of half time would be inconvenient to us, and I cannot think that children could learn much by it, at least if they are allowed to come to work so young as 8.

The greatest number of uneducated children belong to unskilled labourers; the more thoughtful parents of this class send their children at an early age, about 5 years of age, to school, and as the minimum age for printwork labour is 8 years, these children can read when they come to us, between 8 and 9. As a very general rule the children of intemperate and careless parents come to us quite uneducated, and when they begin work in this state their after progress in education is hopeless. So many hours of work and so many hours of school on the same day will not cure this evil, but an educational test before they are employed would do it. A properly organized system of night schools for children of working men would be an opportunity for self-improvement, and would most assuredly be taken advantage of by boys and girls who could not afford to remain so long at a day school as children of the better classes do.

150. *Messrs. Miller, Higginbotham, & Co.*, Turkey red dyers and printers, Netherlee. — (Answers to the printed form.)

Limits when the usual hours are exceeded: The usual hours of work are not exceeded in the Turkey red dyeing department except in the case of accident to machinery when, owing to the nature and operation of the process the routine of the operations for the day *must be finished*, or the work of the day *entirely lost*. The goods must pass through the whole manipulation for the day or be injured to a very serious extent. When any stoppage by accident of the nature stated above takes place, it is invariably considered to be unfortunate by the employer. In the process and preparation of cloth or yarn for Turkey red dyeing there can be no half or quarter days.

Meal times, if not regular: The goods in preparation process for Turkey red dyeing are sometimes exposed on the field to the action of the atmosphere, but in that state rain injures them. In showery weather meal times cannot be scrupulously observed, but plenty of time is always allowed for meals after the goods are secured from injury.

1. The usual hours of work are never exceeded in our works except by accident, as stated above.

2. Any legislation assimilating the laws by which our trade is now regulated to the provision of the Factory Acts would prevent our business of Turkey red dyeing from being carried on with any prospect of success, the nature of it being so different from factory business. Many of our operations are out-door operations. Factory operations are in-door operations, besides various differences in the operations that have no similarity.

3. We are under the Printworks Act, and we do not conceive that any modification of the Factory Acts would at all be suitable for carrying on our business with any prospect of success.

* Cancelled by Mr. Millar on revising, with a note that he could not speak authoritatively as to that department, having no charge over it.—J. E. W.

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4. The children employed in our printing department attend school one day each week, from 10 a.m. to 3 p.m., and there is an evening class provided for those who choose to attend it for one and a half hours each lawful night, except Saturday night.

We may add that we have recently built an excellent school within our work, and provided a qualified teacher at our own expense, as well as supply the children with the books, and we personally superintend the teaching from time to time. We would be glad to have a Government inspector to examine the school annually. The restriction of the education of the children to one day a week we entirely disapprove of, but it is forced upon us by the terms of the educational clauses of the Act. Were we free in this respect we would make a much better arrangement for the children.

151. *Mr. Ronald* (Messrs. P. Jack & Co., tapestry carpet manufacturers, Paisley), one of the firm.—In our business, the manufacture of tapestry carpets, the patterns are formed by printing the woollen warp, which we do on the same premises. Thus part of our works is under the Printworks Act, and the other part under the Factory Act. The work being so intermixed, there was a difficulty in distinguishing the parts coming under the two different Acts. It was arranged with the former factory inspector that only the part in which the actual printing was done should be under the Printworks Act, and we boarded it off to separate it. A little winding by power is now done by girls in part of this room, but this is not reckoned part of the printing. The hands, however, engaged in printing, never work after the factory hours. I do not recollect what was the distinction between the two Acts which we wished to avail ourselves of, but there was some; I think it was that there might be a difficulty if we were tied to the fixed hours for meals in the printing. If the work was left unfinished for an hour the colour could not be levelled properly. The hands, however, generally arrange to get forward and finish a set by the regular time.

The printing is done in a different way from ordinary printing. The warp is wound round large drums, several feet in diameter, and the colours printed by drawing across the threads a pulley or type which takes up the colour from the colour box placed beneath the drum. There are two females and a boy for each pair of drums. One girl fills the drum by winding the warp on. This is then printed by the other, and the first then smoothes down the colours with a rubber. The boy changes the colour boxes. The drums are worked by hand. When the colours have been printed and smoothed, the warp is taken off and steamed in a chest to fix the colours. This must be done on the same day. It takes from half an hour to an hour to print a drum, so a printer commonly does not begin a fresh drum after 5 o'clock, and thus the hands can leave by or before 6.

We prepare the yarn for printing by scouring and sulphuring it, and after it is printed and steamed it is washed by machines and dried and wound on bobbins. These are put on a frame where the threads are drawn out by women and arranged in such a way as to form the patterns ready for the loom. But these processes are not reckoned part of the printing, but come under the Factory Act.

The peculiarity of tapestry carpets is the great variety of colours and shades which can be attained by the particular mode of manufacture. We make patterns with 50 or 60 colours, and there might be any number of shades that might be required up to hundreds. This is possible from the patterns being printed on the warp, and the wool being all on the surface woven on a back of plain material. In other carpets in which the patterns are formed by weaving dyed yarns the colours are necessarily limited to a very few, and the designs, therefore, much less varied and shaded.

There are now only seven firms in this branch of business in the United Kingdom, viz., four in England and three in Scotland, but most of them places of importance. In all of them printing of the same kinds as ours forms part of the work.

We have no wish to work our printing any longer hours than we do. I do not believe in overhours, and I believe that people in general are coming to this way of thinking. I believe that with long hours you do not get more out of your machinery in the end. Formerly, when I was in a regular printwork firm, we had night shifts one time, and found it work very badly.

But we wish to be able to employ children for full time, the work being so light, and to make some other arrangement for their education. We have only a few, eight or nine, out of about 100 persons, and none under 11 or 12. We send them to school every Saturday for five hours, from about 11 o'clock. This is very inconvenient to us. The custom also now in Scotland of closing schools on Saturday in many cases makes it more difficult to get proper teaching then. It was much better when they could go one hour daily. We could arrange for it much more easily, and the boys would get education so. If children go every day, what they learn is fresh in their mind, but going only once a week they forget it. If there is a law on the point, it should see that the boys get what it is supposed that they have. The present plan is a sham.

Formerly I was in a shawl printing business here. This was an important trade in this neighbourhood then, and employed large numbers, probably some thousands of persons. I can count now 13 large firms in and near Paisley, employing upwards of 100 printers each, on the average, say, from 100 to 150. We had 200, and one firm had 300. These were chiefly block printers, and had teerers, and there would be other persons besides. This trade began to fall off after the Exhibition in 1851, and within a few years became of very little importance, and has now disappeared. This was caused by a change of taste. Other things have come in instead, and cloaks and mantles have become so general.

BLEACHING, DYEING, AND FINISHING WORKS.

Bleaching, &c. Works. England. a.

152. *Mr. Edmund H. Sykes* (Messrs. R. Sykes & Co., bleachers, Edgeley).—Since the Bleach Works Act came into full operation, there has never been the full quantity of cotton in the country which there was before, so that it is not so easy to judge of the full effect of the Act on our trade. Our works are (with two or three exceptions, if bleaching and dyeing, *i.e.* both together, are taken) some of the largest in the trade, and probably as regularly employed as any, if not more so. Yet, taking the year through, we never average so much as from 6 a.m. till 6 p.m., and I should say that no others do. I cannot say that the Act has caused us much inconvenience. Probably the merchants find more than we do from it. The effect however was, that at first we could not get so large a quantity of goods through the works as we could have done otherwise, as others no doubt found also, and in several cases goods which would have been bleached in this district were shipped in the grey state.

To meet the requirements of the Act, however, we made improvements and additions, at a cost, as we reckon, on the whole, of about 5,000*l*. This was simply to meet the requirements of the Act, and

has not in any way increased our production. We have also made an increase in our charges for bleaching, but this was partly on account of other causes independent of the Act, such as the increased cost of coal, &c.

Time has been gained in bleach works in several ways, one of these has been by speeding the machinery. Where this has been done without a corresponding increase in the strength of the shafting, the result is that break-downs have occurred and time thus lost again. Time is also gained by having duplicates of certain parts of the machinery which are liable to get injured in the course of work. For instance, the mangling bowls are liable to become indented by creases in the cotton. To take out these and replace them by others, would take two hours and a half, and all the subsequent processes delayed in proportion. So we have now duplicate bowls for each mangle; others who cannot afford it, have to make much longer stoppages, as the bowls have to be re-turned in the lathe.

In our works there is very little time actually lost from accidents to the machinery, &c. One reason is, that instead of depending on one or two large engines, as is the case in many places, we have a great number of small ones, about 30 in all, for the separate parts of the work. We have these as simple and cheap as possible, and they are worked by merely turning on steam from a pipe connected to them. This gives us a great advantage, for if an accident happens in one part it does not so much affect the work in others. If an engine breaks down while the cloth is in the acid we pour in water, so as to prevent the cloth from being hurt.

It is not everyone, however, who is in a position to put down more engines or machinery or increase his works. Most bleachworks are occupied on leases of not more than 21 years. The engines and machinery of course are valued as fixtures. In some cases the works cannot be increased, on account of the want of sufficient water of which a great quantity is required, not as power, but for the bleaching processes themselves. Some bleach works have at times to stop for weeks together for want of water. In such cases bleachers bleach for one another at prices agreed on for this purpose, but each does his own finishing, as one cannot do the finish of another.

In certain cases, extra labour is a great saving of time. For instance, in our mangling set, we have put on extra hands, which enables us to get the cloth through the process in less time, but at an increased cost.

Some delays occur over which we have no control, *e.g.*, from the state of the weather. In winter pipes in the bleaching croft are liable to burst from the frost. This risk may be diminished by keeping up the warmth by steam. The air-drying process is also liable to be affected by the state of the atmosphere. If the air is damp, or the goods heavier than usual, they will not dry so soon. This will delay the making-up girls, and perhaps they may not be able to begin work till 8 a.m., instead of 6, and then they work till 8 p.m. They will generally know the evening before, if this is likely to be the case, and be told by the foreman that they need not come till after breakfast. In some stages goods get too dry. They can be damped artificially, but the effect is never as good. We cannot avoid the irregularity which arises from the length of time which is required in passing through certain processes according as the cloth is lighter or heavier than usual.

The time required for the whole process depends on the kind of cotton and the finish wanted, but is on the average seven or eight days. A merchant expects to have his goods back in eight days. We ask our customers for ten days, including a day for receiving, and a day for delivery. If a merchant presses us for his goods we can hurry them by putting them through two processes in the croft, or bleaching part, in one day instead of in two. If our hours were shortened this could not be accomplished, entirely adult labour being inapplicable.

The processes themselves remain much the same as they were before the Act. The only changes have been those of arrangement and means of economising time such as already referred to.

The main features of the trade and its divisions into different branches also remain much the same. Of bleachers of cloth for the general market there are three chief kinds, viz., bleachers of (1) heavy goods, (2) shirtings, (3) muslins and light goods. We do the two first, some do all. Some only bleach cloth for printers. Yarn bleaching is another branch; this is chiefly for the lace and hosiery trades, and done chiefly near Nottingham and Leicester; but there is also the bleaching of heavy yarns, such as those used for candles, &c.

Bleaching cloth for printers is quite a different process from bleaching and finishing for the market and requires less skilled labour. It is, of course, the same as that done by printers themselves. It is wanted to supply printworks which have not a sufficient amount of water to do their own bleaching, or are on a small scale.

Bleachers cannot work so regularly as printers, who commonly buy, bleach, and sell their own cloth, and can work to stock. Bleachers could not do the same. I have known a case in which it was tried, but the man failed. A bleacher is in a confidential relation with merchants, and if they found that he was bleaching goods on his own account they would suspect that he was not doing his best for them. There are, however, I believe, some bleachers in Scotland who buy and bleach cloth for themselves, and do not bleach for hire.

The finishing process in bleaching resembles machine printing in some degree. We use bowls as they use their printing rollers, and have to change them in like manner for different kinds of finish.

The making-up is the department in which women and girls are chiefly employed. The chief work of the girls is hooking. This work could be done by machinery instead, but we like to keep the girls at it in order that we may have them ready when we require them for book-folding, which cannot at present be so well done by machinery. This class of work comes only by fits and starts, for certain foreign markets and as well as for certain purposes in the home trade, *e.g.*, for everything which tailors use, as these are cut in the double. Also if we used machines instead of having the hooking done by girls, the work would be done faster and so more thrown on the men. The longest hours which I find on looking through the books to have been made in a fortnight in the last few years were occasioned by the book-folding, of which a large amount was required at once; though that was in 1865, which was one of the years in which the total quantity of work was at the lowest.

The best year that we, and probably that the trade in general, has had was that ending in March 1861. In 300 days of that year we bleached more cloth than would go round the world. The following table of the quantities of cloth bleached by us in the last eight years shows to what an extent our business was affected by the scarcity of cotton resulting from the American war, and may probably be taken as giving a fair specimen in this respect of the cotton bleaching trade in general:—

—		By Weight.	By Measure.
		lbs.	Pieces of 24 to 25 yards
For year ending 31st March	1860	7,237,100	1,222,768
" "	1861	9,950,700	1,650,460
" "	1862	7,595,600	1,214,320
" "	1863	3,764,850	630,863
" "	1864	3,348,300	601,111
" "	1865	3,378,300	572,470
" "	1866	7,043,650	1,101,498
" "	1867	8,923,100	1,424,827
" "	*1868	8,000,000	1,100,000

* We have been short of work the last three months. We cannot now with a good trade exceed the average amount (*i.e.* that estimated to complete the table up till the end of our current year, *i.e.* March, 1868).

Bleaching, &c. Works.

England.

a.

The quantity of work done in the trade, taking our case as a fair illustration, may, therefore, be taken as returning nearly to its former amount.

Since the Act, however, there has never been a period of six months for which we have made as much as the full factory hours, and, therefore, in which there was not some time lost to be made up afterwards if desired. The longest hours are made by the makers-up and packers, and I cannot find that they have ever made more than 136 hours in a fortnight. We keep our books by fortnights, and I find that in what appears to have been the busiest period which these hands have had, they worked for seven consecutive fortnights as follows, viz.—133½ hours, 136 hours, 134½ hours, 127 hours, 128 hours, 129 hours, and 126 hours.

We never worked very long hours even before the Act. We did not like them, and I remember an instance showing that even our longest hours did not answer. We were very busy, and working for some time till 10 p.m., but I told the foreman that I could not allow it any longer, and that the hands should not work beyond 9. He said that it would be impossible to get through the work which was to be done working only till 9, and after the change had been made for a fortnight he said that I should find that the amount had fallen off. On the contrary, I found that in that fortnight we had done 5,000 more pieces than we had ever done before.

We have been obliged to raise our wages since the Act, but more particularly the women who can now earn more money by working in the factories. We pay all by piece work as much as possible; but still, when the amount of business done by us is small, the cost of wages is much greater in proportion to our profit. The per-centage of our wages on the money turned over in the first quarter of this year (1867) was 21 and a decimal, as it had been in the time of our fullest employment up to the end of the first quarter in 1861, though the prices being now higher, the true proportion of the wages is now somewhat higher also. But between these dates it had risen to as high as 40 and 50 per cent. and even higher.

Other countries, *e. g.*, France and Germany, are getting to bleach as cheaply as we can. The French bleacher is protected as against us by an extra duty on bleached goods into France. Sometimes, however, London merchants buy foreign cloth and send it to this district to be bleached. Our ordinary charge for bleaching is, light goods ¼*d.* per yard; heavier goods, weighing more than ¼ lb. to the yard, are charged 1⅛*d.* per lb., and something additional in the case of goods requiring book folding or ribboning.

With regard to the education of children, I have always been of opinion, and as a magistrate have expressed it, that a child should not be allowed to go on full time till it can read and write. I will not take any who cannot. Four in whose case I did so all turned out badly afterwards. A friend of mine in a firm which has both a factory and bleach works, says that he wishes that they could enforce the same rule, as they find that children who have not been taught to read and write are commonly more troublesome, and also frequently come from bad parents.

London merchants are now buying cloth largely on the continent. At present it is sent in considerable quantities to Lancashire to be bleached and finished, one bleacher alone averaging about 2½ tons per day. Machinery has been erected abroad by an iron founder in Bolton to do this work, and considering the extra cost of carriage, and more particularly so if our hours of labour are further restricted, the Lancashire bleacher is likely soon to be driven out of this market.

In legislating for women and children Government should bear in mind that they are legislating for adults also, as the work cannot be carried on by adults without the assistance of the younger hands.

153. *From further communications from Mr. Sykes.* When I was on the continent, soon after the French treaty, the prices of bleaching were 25 per cent. higher than ours. Now they are similar and not higher, one firm (Belgian) having lately adopted our own list. The English finish may at present be superior, and it has the advantage of being what people have had before, but where there are the appliances it only requires the talent and perseverance, and that you will find in Belgium, &c. To shorten our hours would increase our cost of production. This would give the foreign bleacher an advantage, and he would soon be able to bleach not only his own production, but also a portion of the calico produced in this country.

154. *Mr. H. Bridson* (Messrs. T. R. Bridson & Co., bleachers, Bolton and Lever Bank).—Owing to the fluctuations of trade, and in some cases from accidents, our hours of work often fall short of the legitimate 60 hours per week, and lost time is made up as occasion requires. If the Bleachworks Act were assimilated in every respect to the Factory Act it would curtail our hours of labour to less than 60 hours per week, inasmuch as a certain preparation for leaving off and commencing work is necessary in our business, which is not the case in a cotton factory. The power which we now have of making up for lost time, from the above or other causes, gives us a better chance of getting our 60 hours labour in the course of the week, but as up to the present time an average of full work for each day, from 6 to 6, has been found impracticable owing to unavoidable variations in the supply, it follows that the result of a limitation to the factory hours will be a reduction of the working hours most likely to some eight or nine hours a day only, or 40 or 50 hours per week.

The difficulty of securing regular hours in bleach works arises from our not working on our own materials and from the irregularity with which goods are sent to us. It was said that if the Act was passed, merchants would adapt themselves to the new state of things and send their goods regularly. But they do not. In fact they do not think about the matter at all, but send their goods only just in time to get them back when they want them, just as they always did. It is not at all likely that they will ever send them more regularly. In itself it is no doubt desirable to have the Acts relating to different trades as much alike as may be.

Of course if, for the convenience of inspection, the liberty of making up lost time were taken away the difficulty would be provided for somehow. Such a change would probably make the work of inspection more easy. We keep a book of the lost time as we are required, and it serves for our guidance, but I believe that we are not under any legal obligation to show it to the inspector, though we have no objection to doing so. It is doubtful, however, if such a change would be any benefit to the workpeople. We should put down more machinery and make such other additions as we found necessary in consequence of the change, but it would involve an increased outlay of capital, and of course we do not wish to make this without the prospect of an adequate return from it.

The Act compelled us to lay out more capital in order to hold our position and be able to produce as much as we could before the hours were limited, and we have never since the Act produced the full amount which we considered we were able to produce when the hours were not limited. Seven-eighths has been our nearest approach to this, but our machinery had to be increased. In four weeks of 60 hours each we have produced eight-ninths of the largest quantity which we ever produced in any four weeks before the Act, but I cannot say what number of hours were worked in those four weeks though no doubt they were very long.

With regard to the work of the females, engaged as most of them are in mere manual labour in the making-up room, or in needlework as stitchers, &c., we could get through this without any increased outlay, but simply by increasing their number. Any women could do this work. It would cost us no more, but our present hands would of course lose something.

There have been no changes in the mode of bleach-

ing or finishing since the Act, or in the last ten or a dozen years, beyond the natural course of improvement always going on in any trade. There has, however, been a far more general appreciation of the value of time. The bleaching portion of the business is a very simple and comparatively unimportant part of the whole. The finishing is the more important and difficult part of the business.

The cotton bleaching trade is a very small portion of the whole cotton trade. Only a very small proportion of the goods manufactured in the country and exported are sent out bleached. Of those exported to India the proportion which goes out bleached is less than it was, probably on account of bleaching being done there to a greater extent, but I do not know of any decrease in the proportion sent out bleached to other countries.

The cost of bleaching forms a very small part of the wholesale price of the goods. In average shirtings, for example, it forms not more than a tenth of the whole price probably. The cost has been slightly increased since the Act, chiefly in consequence of the increased cost of coal, labour, &c., and also from the increased outlay of capital required.

The bleaching trade as a whole is quite equal to producing under the present conditions what is required of it now, but it probably would not be if the cotton trade were fully to recover itself. Probably there is no place in the trade which turns out so much work as ourselves, *i. e.*, so far as mere bleaching and finishing, *i. e.*, of white goods, are concerned and exclusive of dyeing.

There are some difficulties of detail in working the Act. Parts of the work cannot always stop at the exact time for meals, and in such cases the place of boys has to be taken by males over the age of 18, which the men arrange amongst themselves. We thought that we should give up half-time children in consequence of the Act, and do so as far as we can; but we find it desirable to keep some in order to train them up to the work. The half-time system works satisfactorily with them.

As far as we possibly can we avoid making up time, and especially on a Saturday afternoon. As regards the liberty of making up time on that afternoon we might be willing to give way.

We are satisfied with the present Act and believe that bleachers in general are so, but the general feeling is, we believe, against any further change.

155. *Mr. William Henry Jackman*, manager.—I am made responsible for seeing that the account of the time worked is correctly kept, and the proper amount never exceeded, and have the strictest instructions on the point, and give the like instructions to all the foremen under me. This is necessary, for when we are busy they are constantly anxious to make up more time, and it is extremely difficult to get the people away. At the Lever Bank Works in last autumn we were working the strict factory hours for as much as three months together, and could not exceed them because we had no previous lost time to make up. We should have wished to work longer hours, but were that tied down by the law that we could not. The amount of time lost there in that whole year was 66 hours.

If possible, we keep some lost time not used up, so that we may have some to go to if there is any particular occasion. It is injudicious to use it all up at once. There might come an occasion on which a couple of hours, which might be made up, would be all important.

The lost time register is kept in the manner required by the inspector. I have had many conversations with him about it. The names are entered in sets or departments, and the hours of the longest worker in each set put as the hours of all in that set. Only the overtime is booked, nothing else. When only the full time, or less than the full hours are made, the day is left blank. Of course this does not show how much time there is to be made up, or whether there is any.

For this purpose a private book is kept which shows the hours actually worked. The amount of lost time is not added up in this book, but we add it up for ourselves when there is occasion; *i. e.*, when we are getting busy and know that the time of any set is nearly used up, so that we must be particular to add up what time they are able to make up.

There would be no objection to our being required to keep a fuller book of this kind instead of what we are required to keep. I would suggest that a debtor and creditor account should be kept, showing the time lost and the time made up, set opposite to one another. That has been my opinion for a long time.

I never heard of time being made up at night in any bleach works in consequence of being lost by want of water power. If it had been the case I should no doubt have heard of it.

156. *William Rostron.*—I have been foreman of the fancy making-up room 10 or 12 years, and have under me towards fifty young women and girls from 13 upwards. I would sooner that the law should remain as it is. I should not like not to be able to make up time occasionally; as a general rule we do not do so for more than a fortnight at a time, though we have occasionally. We very seldom make up time on Saturday afternoon; all wish to be free then.

But I should not like to go back to things as they were before the Act. We get as much money now as we did then but in shorter time. The work is better arranged. On the old system we used to have to wait one for another, now it is so arranged that the work comes up to the time and each set is kept going. Also I believe the machinery is better adapted to the work. I am sure that the females who were here before the Act prefer things as they are now to what they were then. They cannot earn so much in one day, but taken by the fortnight they earn fully as much or more. A certain amount is paid for a given number of pieces divided by rating amongst a set. This amount is the same as it was. Working moderately as they do now they can work quicker and do it better.

I have spoken with other foremen and think that most are much of my opinion as regards the present law, but I cannot speak as to the general feeling of the hands.

157. *John Young.*—I have been foreman of the shirting making-up room seven years and have been in this department from a boy. There are about 20 women and girls under me. I have heard what William Rostron has said; I think just the same. We have made up for a month together. This last year our work has been very regular.

158. *John Gregory*, foreman of the elastic finish department. The general feeling of the men in these and other bleach works, so far as I have conversed with them, is in favour of the ten hours Bill. I am often amongst them; they would be content and would wish not to make up time. There is a general feeling that they would not lose anything in the long length, *i.e.*, taking the year through, because the work would come more even.

Our department was very irregular, one of the most so; we are now obliged to have more adult labour instead of women and boys, so a man gets a less share. The same amount of money is paid for the same quantity of goods. Still though we do not get so much we prefer to be as we are now, instead of as we were. I cannot speak of one who would wish to work as we used.

Giving over at 6 or 8 o'clock has given a very good feeling. Still there is a longing desire to have it fixed for 6 always.

159. *Elizabeth Smith*, maker up.—I have been 11 years at this work. I like the work much much better than as it was before the Act; we make as much money; we do not wait so much. We want to give over at 6 always, we have looked for it for a long time, but are a long time in getting it. I would sooner give over at 6 and get rather less money, we all should I am sure.

160. *Jane Hampson*, stitch marker.—I have been ten years in bleach works. I like the work best as it

is now. We are not hard worked now. I don't see that it has made any difference in the earnings; we should all like to give over at six even if we got less, we should have more time of our own.

161. *Mr. R. Bealey,* (Messrs. R. Bealey & Co., bleachers, Radcliffe.)—I always approved of moderate hours of work, and before the passing of the Bleach Works Act was in favour of legislating to some extent to secure them. I should have desired a limitation of work from 6 a.m. till 8 p.m., and consider that on those terms we should not be more than on an equality with cotton spinners. The bleaching trade is peculiarly circumstanced, and the points of difference between it and cotton spinning are set out in this paper here which was drawn up for the purpose at that time. I see that since then the question has been considerably altered by the extension of the Factory Acts to manufactures in general. But some of the peculiar circumstances referred to still remain and distinguish bleaching from other trades. Such special circumstances ought to be taken into account in any legislation.

There have been no material changes in the processes or in the general features of the trade in the last ten or a dozen years.

Before the Act passed I was prepared to work under it, and had made considerable outlay for the purpose. But owing to the cotton famine I have never reached the ordinary quantity which I used to produce before the Act. I estimate that even with making up lost time I could not produce more than 80 per cent. of that quantity. My own business was of a kind which was peculiarly affected by the American war, and it takes a considerable time to recover from such a violent disturbance and to fully establish a new branch of business in place of one which was nearly destroyed, as I have found it necessary to do. I employ about 300 persons here.

Owing to these events which followed on the passing of the Act its effects were not fully felt at once. Indeed I should say that even yet the Act had not been fairly tried, and that though no doubt in many cases the business may have recovered itself, still the effects of the Act had not yet been fully realized throughout the trade as a whole.

The proportion of cloth which is exported in a white or bleached state is much less than it used to be. About 20 years ago this proportion, as nearly as I could estimate from my observation and inquiries amongst customers in the course of my business, was about 10 per cent. of the whole, *i. e.* of both white and grey, and merchants generally gave me that as their opinion. Now it must be much less, but I cannot say how far, nor can I assign any causes for this diminution.

The possible effect of legislation in increasing the cost of production is a very important question, especially in reference to Belgium, where the wages are so much lower than here. I have visited bleach works in Belgium.

If there is to be any legislation I should accept a limit of from 6 a.m. till 7 p.m. without power of making up lost time, in preference to the strict factory hours. Such a limitation would meet most of the requirements of the trade; but I prefer the present plan, which gives more elasticity.

I think it fair, however, that if time is allowed to be made up, the inspectors should have every facility for seeing that the law is observed. I should have no objection to a more detailed book than the present law requires to be kept if time is made up. Some plan should be devised for keeping a full account of the time worked, and when and why any was lost, *i.e.* showing the time and the cause of the loss. I do not care how strict the formula is made. If a law exists it should be strictly kept.

I should see no objection to putting up in each room a duplicate of the account in the book, so that any of the workpeople could see it, or to sending a notice to the inspector when time was going to be made up, though the latter might be more troublesome.

I should be willing to give up the liberty which we now have of making up time on a Saturday afternoon. My instructions are that time is never to be made up then except on great pressure.

162. *Mr. James Smith.*—I have charge of the time books. The hours worked are entered in the lost time register only on the days on which overtime is made, not when only the full day or less than the full day is made. The time of each room is put separately, and the time of the longest worker in a room is entered as the time of all in that room. Till lately the time was entered only as so many hours in the day; now it is entered so as to show the hour of beginning and the hour of leaving off. Time is never made up for less than an hour in a day, and very seldom indeed on Saturday afternoon. Work stops at 2 that day. At the end of each week the amount of time lost and of that made up are entered in two parallel columns. These are not added up weekly, except when the amount of time lost is nearly made up. There is no occasion otherwise, as the difference between the two columns can be easily seen. The strong cloth finishing department, including in this all that comes after the bleaching, is the part which has been most liable to make up time. It has done so for about three months consecutively. There might be occasional exceptions of a night or two in this period, which is the longest which I have known since I had the books, *i.e.*, about 16 months. At another time these hands made up time for about six weeks consecutively, and for shorter periods, down to only on a single night at a time. In the shirting finishing department they have made up time for about ten weeks at a time once; but in no other case for more than a fortnight.

163. *Jane Fielding.*—I have been here 28 years. I do not make so much money as I did with the long hours, but I would sooner have the work as it is now. Ten hours always would be better. We would sooner give over at 6, even though we should not get so much money. Till 6 is long enough. The other women think like me, I believe.

164. *Mr. Christopher Howarth* (Messrs. Thomas Ridgway & Co., bleachers and dyers, Horwich), one of the firm.—The present Bleach Works Act is very fair to all parties, and works satisfactorily and well. It would be injurious to the trade to take away the liberty of making up lost time. Bleaching is a trade in which there must be pushes. In this respect it is just like agricultural labour. The business is not more regular than before the Act; but the time worked much more so than ten or twelve years ago, when the hours were excessive, and altogether unnecessary. But no change in the law could effect anything further in this direction. There is no prospect whatever that merchants will send bleachers their business more regularly, so as to allow of the work being done between 6 a.m. and 6 p.m. If it could be, everyone would much prefer it. It is to our interest to have the work done as regularly as possible. But the fact is that goods are kept in the grey till the merchants get orders, or the markets are in such a state as allow them to operate. Then large quantities are sent in at once to the bleacher, and wanted immediately. We cannot avoid this, however much we may wish. Our business is mainly for the shipping trade, except the dyeing branch.

The foreman in each room keeps an account of the time worked by his set, and enters it in a rough book which is left lying on his desk, so that all the hands have access to it and can look at it if they please, and some, I believe, do so.

Hands prefer our work to that of the neighbouring factories, because ours is healthier and cleaner, and partly also the wages are a little better. We employ about 300 or so.

There has been no change of importance with regard to the bleaching or dyeing trade since the Act, either as to the processes or general nature of the trade, or as to the mercantile relations of the business.

165. *Mr. John Howarth.*—I have charge of the lost time book. The calendering is the part in which most time is made up. In the last half of last year

the boys then made up time in 14 out of the 26 weeks at the rate of from one to six hours in a week. The making up department, in which there are women and girls, comes next in amount. I should say that neither of the two have ever made up time for more than three weeks continuously, if so much. The tambourers may perhaps have done so for four or five weeks. It is quite exceptional to work after 6 o'clock on a day in which less than the full 10½ hours has been made. It happens occasionally, *e.g.*, when there is a break down.

166. *Ann Crashaw.*—I like the work best far away as it is now, instead of as it was before the Ten Hours Bill. We give over at 6 now, and hardly ever stay later. We have stayed less since work became good again. Going away at 6 gives us time to ourselves and for our houses. I cannot think but what it is better for the master, too, than when we worked late. Work is got forward through the machines ready for us, so that we can begin at once. We often used to have to wait before. I came here as a girl nearly 40 years ago, but was away for several years after I married. I have not heard anything said about any change in the law. We are well satisfied, and ought to be, as our work is here. We are so regular, and the master is very particular about it.

167. *John Gee*, foreman of the dyehouse.—In our dyeing, calico dyeing, a run of the regular length takes, say, from one and a half up to nine hours according to the colours, but some colours can be left for the night at a certain stage. I arrange the different kinds so as to get them done by 6 o'clock. If a man understands his business it is easy for him to do this. We only work past 6 when more work is wanted. Almost all the hands engaged are men. Our dyeing is different from printers' dyeing, but more particular I should say. I have been in different calico dye works; they generally give over as we do at 5 working the dinner hour.

168. *Mr. J. Stanning* (Messrs. R. Ainsworth, Son, & Co., bleachers and dyers, Halliwell), manager.—We work the strict factory hours for all children, young persons, and women throughout the whole of these works, and have done so ever since the time when the Bleaching and Dyeing Works Act of 1860 came into operation. Their hours are from 6 a.m. till 6 p.m. on the first five days in the week, and till 2.30 p.m. on Saturday, with intervals from 8 to 8.30 a.m., and from 12 to 1 p.m. on all days, *i. e.* including Saturday. We let the Act take its fullest possible effect, and do not even avail ourselves of the liberty which it gives us (s. 2) of making up lost time, or keep a register of the time lost. It would be very troublesome to keep it, and at any rate we find it much simpler and easier to dispense with it, and the power of making up time by means of it altogether.

I do not wish to express an opinion as to what may be necessary in the case of other bleachers differently situated to ourselves. I desire simply to say that we shall continue to work the Bill in its integrity, as we always have done.

Before the Bill passed I was of opinion that any such measure would cause us very great inconvenience and probably lead to our discharging a large number of the persons whose labour would be interfered with by it, and gave evidence to the Commissioner to that effect. My opinion was borne out by the result so far that we did at first find considerable inconvenience from the Act. But the late Mr. Ainsworth, though he had been strongly opposed to the measure before, was desirous of carrying it out in its integrity when it became law. Accordingly we accommodated ourselves to it as well as we could, and have gradually succeeded in bringing ourselves into a position in which we can work under the new system with little difficulty.

I cannot say that any special additions or increased outlay were required at once. We have watched to see any difficulties as they presented themselves, and have removed them one by one as seemed most desirable. The total number and the classes of hands, and the rate of wages paid to each for the same amount and description of work, remain much the same as they were before the Act. Nor has the amount of work produced in the year diminished, making due allowance of course for the diminution consequent upon the scarcity of cotton caused by the American war.

This firm has probably the largest business of the whole trade in fine and fancy goods, and as these are more especially subject to variations in demand owing to seasons and other causes, the difficulties occasioned by the Act must have been at least as great here as in any other place, probably greater. The firm has also a large general business including most of the kinds of work done by other bleachers.

169. *Ann Howarth*, maker up.—I have worked here 33 years. We only work till 6 o'clock now. I like this much the best. Of course I cannot earn so much money now as I could in the long hours. I have got as much as 15*s.* or 16*s.* in a week then; but for all that I would sooner be as we are now, and I think that all the other women would too. [Mr. Stanning stated that this woman had earned as much as 16*s.* in a week even under the short hours.]

170. *Mr. S. Blair* (Messrs. Blair & Sumner, bleachers, Bolton).—Since the Bleach Works Act was passed there has been no chance of testing it fairly. The American war began soon afterwards, and then for a long time, owing to the cotton famine in Lancashire, there was very little to be done in the trade. It is difficult to judge how the Act would work until the cotton trade is properly settled again. It is in a very unsettled state just now, owing to the late rapid rise in cotton. The Act should not be altered till it is seen how it will work. If it is found not to work well it will be time enough to alter it then. If there is to be any alteration, bleach works should be placed under one Act with the print works, as they are trades of the same kind, but not with cotton factories, for reasons explained.

I am well satisfied with the Act as it is. We never worked and never wanted to work long hours. I should say that no place worked such short hours before the passing of the present Act. If we had the power we should not wish under any circumstances to work beyond 8 o'clock. If any change is made in the law, it should be one allowing us to work from 6 a.m. till 8 p.m. without reference to lost time. This would be much the same in practical effect to us as the present law. As a rule we should not work beyond 6, though often less, and till 8 only when we are busy, as we do now; but this plan would save the trouble of book-keeping, and the difficulties connected with making up lost time. We are extremely particular in keeping these accounts accurately, and in observing regularity of every kind.

There is great risk that if we are interfered with further the trade will be seriously injured. Constant interference with trades tends to drive them to other countries. Foreign competition is very serious now. Great quantities even of cotton goods now come into England from Belgium. There is no doubt of this, for they are brought to Bolton to be bleached; this so far as I know has only been the case quite lately, say within the last five years. There are several other trades in which there is a like increase of foreign competition, owing partly no doubt to labour being so much cheaper abroad.

There has been no change of note in the trade since the Act passed nor for some few years before it. Business is conducted in much the same way and the processes also remain much the same. It is about 15 years since we substituted machinery for hand labour in bleaching. This method which is now in general use was brought from Belgium. We did not find it necessary to enlarge the works or add to the machinery on account of the Act, but we have been obliged to raise the charge for bleaching somewhat; this was owing partly to the great increase in the price of coals which are a very large item in our cost, and are now a third more than they were a few years ago, and have been

nearly double; and partly also to the increase in the price of labour generally.

171. *Mr. Thomas Glaister.*—I superintend the office part of this business. The annexed scale (not inserted here—J. E. W.) shows the fluctuations of work during the past year, 1867. The top part of the irregular line represents the largest quantity done in any one month, and the bottom the lowest. The difference of these is as 5 to 11,* *i.e.*, the quantity in the lowest month was not quite half of that in the highest. This year was as regular as any that we have had. Notwithstanding any change in the law, the fluctuations will, I fear, always occur much as shown in the scale, on account of the season markets, though there may be a variation as to the months between one year and another.

Time is not made up for long periods together; the longest consecutive period for which it was made up by any one department within the last year was not more than two or three weeks. Autumn and winter is the busiest time generally.

When we are going to make up time I always write to give the inspector notice of the amount which has been lost and of our intention to make it up. There is but little trouble in doing this. We never make up more than seven and a half hours in a week, and never any on Saturday afternoon.

172. *John Spencer, senr.*, stamper in making up room.—We think that when we have worked from 6 till 6 we have done enough; we do not expect to make as much money working till 6 as working till 8, we understand that very well, but we do not want to fetch up the lost time; if you asked more they would say the same. I know of no difference of opinion about it amongst our people here. I have been here 30 years, we all much prefer things as they are to what they were before the Bill. We get very little if any less money; this is because the people are that much fresher for the work, and we have to wait very little. We keep having plenty of work, now, and for the last two years have not made up or lost much time.

173. *Mary Ann Sharples*, in making up room.—We all wish to give over at 6 always, we talk about it amongst ourselves, and all think the same; I never heard of any who think differently. If we lose by it, we must let it be so. We wish to look after our own work at home. We often work till 7 or 8. We do not get any less than when we worked longer. At my work, silking, I sometimes get above 30*s.* in a fortnight.

174. *Margaret Hardman*, in making up room.—We want to give over at 6 oclock. We have to work harder for our money than we did in the longer hours.

175. *Mr. Obadiah Ashworth*, bleacher, dyer, and embosser, Rhodes New Works, Middleton.—My business is bleaching, dyeing, finishing, and embossing, which I carry on at Rhodes New Works, Middleton, near Manchester.

The Act of 1860 for regulating the hours of labour of females and young persons, did not injuriously affect my business or cause serious inconvenience. Before the Act, the hours of labour in the trade (which for many years previously had been excessive) were being lessened, and a general improvement was going on. The passing of the Act which I consider was a wise and humane act, very much accelerated this improvement, and awakened in the trade new activity and intelligence, and quickly produced results for good, which would otherwise have been slow, and taken many years to accomplish.

New machinery on improved principles was introduced or extended in the bleaching and dyeing operations; the direct effect of which, was to lighten labour and shorten the hours of work.

This was pre-eminently the case in the bleaching, nearly all the operations of which are now performed by machinery, the workmen having now only to watch the operations, to see that all goes right.

In my works the hours of labour are from 6 a.m. until 6 p.m., excepting on Fridays, when business continues until 7 p.m., and on Saturdays we stop at 1 p.m.

In the ordinary state of our trade, these hours of working do not vary, but in the case of any stoppage or interruption of business, or a sudden influx of urgent orders for foreign markets, we sometimes work a portion of the hands until 7 or 8 o'clock p.m., one or two nights per week, according to the necessity of the case.

This necessity for extra hours of work may continue for two or three weeks together, and it may occur three or four times in the year, according to the state of trade, especially the foreign trade.

In my works, we carefully avoid working over hours on Mondays and Saturdays, and we try, as far as possible, to arrange the work in such a way, that the extra time shall be worked on Thursdays and Fridays. This mode of working the extra time, we know suits the hands best, and is rather popular with them than otherwise. It does not interfere with their comfort, their evening amusements, or means of self-improvement. Attention to these, and such like matters, especially the regular stopping at meal-times, greatly promotes good order, good feeling, and the mutual advantage of employers and workmen.

To the best of my knowledge, lost time and overtime, in my works are about equal.

The regular hours of working in the bleaching and dyeing business are very seriously affected by the ebbs and flows of trade, especially the foreign trade, and are also interfered with, though to a much less degree, by occasional break-downs in machinery, holidays, drought, and other causes, which no ability or attention on the part of employers can prevent or control.

From these and various other causes, perfect uniformity in the hours of working is impossible. During periods of depression in trade lost time is unavoidable, and in like manner in prosperous busy times occasional over hour working is also unavoidable.

The Factory Act I do not consider strictly applicable to trades, like printing, bleaching, and dyeing, because in addition to the interfering causes named, these trades perform the last operations upon goods previous to their immediate shipment to foreign countries, and often have to assist in fetching up the time unavoidably lost in the execution of foreign orders.

For example, a commission merchant when he receives foreign orders, may not be able to execute them at the time through the high prices ruling in the market, or through various political, financial and foreign causes beyond his control. Hence delay takes place, and a pressure is thrown upon the bleacher and dyer when the favourable moment arrives in which the merchant can act.

This prudent watchfulness on the part of the merchant, and the quick active co-operation on the part of the bleacher and dyer, should not be lightly interfered with by the legislature.

Already in America and on the continent bleaching and dyeing are carried on, and every year additional machinery, precisely the same as we use, is put to work in these countries. If it be true that wages are lower on the continent, and the hours of labour longer than in England, it surely behoves the Government, the employers, and the workmen of England, to carefully consider and not undervalue this growing competition.

The spinning and manufacturing trade working under the Factory Act, has the advantage of performing the first operations upon goods, and a large portion of its productions are made for stock, and for distant delivery in point of time. The large quantity of grey calicoes in the Manchester warehouses always on hand waiting to be sold clearly testify to this fact. This striking difference between the manufacturing trade, and the bleaching and dyeing trade, ought to be carefully noted, in any attempt to assimilate the same law, for regulating the hours of labour in the two trades.

The dyeing and printing trades labour under a

* This should be "9" instead of "11," and the "not quite," therefore, should be "rather more than" half.—J. E. W.

further disadvantage on account of their complicated processes and operations. In the case of dyeing, various colours and shades have to be produced, many of which are very delicate, expensive, and occupy many hours in completing. These operations are performed in vessels called becks or jiggers, through which the cloth passes many times, backwards and forwards by means of a reverse motion of the machinery, made for the purpose. It is both desirable and necessary in many of the operations of bleaching, dyeing, and stiffening, (especially in the case of expensive fancy colours), that the operations, when once begun should be completed, or brought to such an advanced state, that no injury will be caused by the stoppage at meal-times or night. Occasionally, though not often, workmen fail to observe these requirements, and when stopping time arrives, one or more may be found, what is called "behind with their work" and have to remain one or two hours after all the other men have gone home. It also sometimes happens, that a workman is obliged to go home one or two hours sooner than the regular stopping time, partly in consequence of work not being ready for him, and partly because it would not be advantageous to commence particular expensive colours at a late hour of the day.

In the majority of cases these little irregularities are caused by want of forethought and intelligence on the part of the workmen, and would almost disappear if they were educated, either by compulsion or other effectual means. As a rule employers like all their workmen to start and stop at one time.

I believe the majority of employers are opposed to irregular and excessive hours of working, because such irregularities increase and prolong the labours of supervision, and greatly increase the anxieties of management and yield little or no advantage in return.

It may also be stated with confidence, that in very many concerns the employers entertain the most kindly and generous feeling towards their workmen, and endeavour in every possibly way to lighten the work, and shorten the hours of labour.

Outside the works, and apart from business, the feelings are testified in many pleasing ways.

I am of opinion that the law, as it now stands, for regulating the hours of labour has already achieved the main object sought, and that any further legislation on the subject should be very judicious, and be merely to amend defects and supply small deficiencies.

The working classes have no longer any cause of complaint on account of excessive working, and the Government of the country having done them ample justice should not indulge them in unreasonable and dangerous demands at the expense of either their employers, or to the injury of the great commercial interests of the country.

Legislation on these subjects should now and henceforth be for the great interests of the country, and not for the special benefit of any one class, even if that should be the working class.

In the foregoing remarks, I have endeavoured to show that over-hour working in such trades as bleaching and dyeing arises from two causes, which may be termed internal and external.

The internal causes relate to the suitability of buildings and machinery for the business, to skilful management, and to the ability and conduct of workmen. Over-hour working depending upon these circumstances can, I think, be almost entirely avoided.

The external causes relate to the ebbs and flows of trade and to the political and financial state of the various countries of the world with which we trade. Over-hour working dependent upon these causes, I think, is totally beyond the control of either Government, employers, or workmen.

To meet these external and inevitable irregularities of trade, I consider it necessary that bleachers and dyers should have the liberty of working four or six extra hours per week for short periods, for three or four weeks in succession, and to be repeated, if necessary, at intervals of not less than three or four times in the year.

This, I think, would be no hardship to the workmen, and would help the employers, and merchants, to preserve our foreign trade.

I consider that a simple plan of this kind would be much better than the present plan of working up lost time, which is complicated and difficult of being correctly carried out.

I believe also, it would be fair to all parties, and work well.

I cannot conclude these remarks on the limitation of the hours of labour, without pointing out the urgent necessity of an early educational measure for the working classes. The ignorance of workmen in our trade, and no doubt in all other trades, is a great difficulty, and seriously prolongs the hours of labour, and adds to its expense. Every year this ignorance is felt with increasing force, on account of the new and increasing requirements of commerce, the advancement of the middle and upper classes, and the great expansion of ideas on all the questions of human interest and progress. I sincerely believe, that an Act for enforcing compulsory education, wisely framed and wisely carried out, would prove the most merciful and beneficial act ever passed by the English legislature.

NOTE.—I am strongly of opinion that it would be of great advantage if Government sent out commissioners to the United States, to France, Belgium, Prussia, and Russia to inquire and ascertain the wages paid to, and the weekly hours worked by the workmen of those countries in such trades as spinning and manufacturing, bleaching, dyeing, and printing, and in such other trades as now compete, or are likely soon to compete against England.

The valuable information which these commissioners would obtain, together with the inquiries and discussions now taking place in this country, would enable the Government to arrive at just and sound conclusions on the three important questions of the day, viz., compulsory education, abolition or strict restriction of trades unions, and the limitation of the hours of labour.

These three all-important subjects are closely and intimately connected together, and should be considered, and if possible dealt with, at one and the same time.

176. *Mr. Thos. Peake* (Messrs. J. Smith & Co., bleachers, Great Lever), manager.—I have had thorough practical experience in every department of bleaching, and have been engaged in bleach works upwards of 40 years, and for more than 30 of them as manager here or at other works. About 200 persons are employed here.

The present law was a wise and liberal measure, and just to employers and employed. I never hear any complaint of it on the part of the masters. I would not on any account go back to the former state of things. I value the regularity of hours and the short Saturday afternoons, and the opportunities of improvement which they give to the workpeople too much for that. But I should be afraid of making any change in the present law for fear of doing mischief or losing some of the benefits which have been gained.

I like the principle of work only from 6 a.m. till 6 p.m., which is a reasonable day's work, and like to keep as nearly as possible to this as a rule. But though we can calculate the amount of work which can be turned out in a day, as a rule, still little hindrances do and may often arise and delay the work a short time, and it would be a very great inconvenience and serious loss if we were compelled under all circumstances to stop exactly at 6 o'clock. Men do not like to take the boys' work. I should not be willing to lose the liberty of finishing the day's work which the present law practically gives us. A liberty of about half-an-hour is all that we are likely to want for this purpose in a general way. The time which is lost enables us to provide for these accidental delays, and as I like to have a reserve to draw upon for this purpose, or in case there should be a variety of work causing a run on one particular machine, I do not like to use it up for the sake of doing more than the usual day's work; and I do not like to make up time on a Saturday afternoon.

Bleaching, &c. Works. — England. — a.

We have lost but little time of late. For the last two years the trade was, I should say, pretty well recovered from the effects of the American war. Last year we did not lose, including the legal holidays, more than three weeks, or possibly from that to a month, and the year before about the same.

The Act did not make much difference to the amount of business at these works, and no additions or enlargements were required. In properly and scientifically balanced works each part is arranged so as to work evenly with the other parts and get through an equal amount with them, so that an enlargement of one part would be of no use without an enlargement of all. On Saturday the amount of work is about three-fourths of what it used to be when we stopped at 5, but on the other days it is about equal to what it was.

It is true that work does not come in to us evenly, but there is generally some waiting for their turn which we can go on with, though less than usual is coming in on given days. In a general way a customer expects his goods back in ten days. They could be done in six or eight if they could be attended to at once, but that cannot be expected. We are now taking three weeks for them.

A wonderful saving of time has been made by the substitution of washing machines for the old dash wheels. The saving is not merely in the time of one washing, but this process is repeated on the average about thirteen times at least for each set of goods, and it may require to be done oftener.

We can stop at the fixed meal times without difficulty, and never have occasion to put men in the boys' places at these times. Our bleaching is the same as the printers', except that they have not to finish the cloth when bleached, which is much simpler than our finishing. We do not lose much time from break-downs or repairs. We look to the machinery on the Saturday afternoons and at spare times, and this enables us to guard pretty well against break-downs.

The moral effects of the Act are good, but they cannot be seen fully till a new set is trained up under it, though I can see something of them. I was opposed to short-timers at first, but took some as being widows' children, &c., and we like to bring up our workers from when they are quite young, as these always make the best hands. It is astonishing how they get on with their schooling, though only at a school taught by a woman. If they were under a properly qualified teacher their progress would no doubt be still greater. It seems, too, as if they worked harder here to make up for their shorter time.

Apart from this, however, there has been a very great improvement amongst the workpeople generally of late, not only in these, but in other bleach works. I know this. They are more intelligent, certainly, and more disposed, as well as more able, to take care of themselves than formerly; but they are also far more moderate and orderly.

177. *Mr. James Perceval Cross* (Messrs. Thos. Cross & Co., bleachers, Bolton).—I take the practical management of this business for my father, but have only done so within the last five years. The business consists of two branches, viz., light goods and heavy goods, and employs about 250 persons. In the light goods department for the last two or three years we have not lost, and therefore not made up any time worth speaking of. The other department has not been so regularly employed as yet. Up till the last two or three years there was great loss of time in both branches.

We are satisfied with the present Act, as I believe the others are also. If the power of making up time were taken away it might in some cases prevent goods from being bleached in this country at all. No doubt if goods were wanted by a certain time, and one bleacher could not undertake to do them by then, they would in ordinary cases be sent to another less fully employed who could undertake them. But this would not necessarily be the case. In one instance in which we had to refuse an order because we could ot undertake to do it in time the goods were sent out grey.

It is very seldom that any time is made up on a Saturday afternoon. Part of the works in which men only are employed run night and day.

178. *Eliza Frear.*—I like our hours much better as they are now than as they were when I began in bleach works; that was about eight years ago. We generally work only from 6 till 6. That is quite long enough for anyone to work. I should like it very much if we were not allowed to work after 6. There is not one but what would like it. Many a time we have given over then when they wanted us to work longer. If people work late they cannot go anywhere like to schools or classes. I have sisters in two other bleach works. They think the same as I do. It would be a good job for all if we could be the same as they are in the factories. The work is much better for us now than as it used to be. It is ready for us when we come and more regular. We were often doing nothing then. I don't think that the women pay anything to the bleacher's association, but I believe there were very few who did not go to the tea party and the hall was quite crowded. I have been to one of the teas.

179. *Mary Jane Philips.*—I like it much better now than when we used to work late. I have been here 10 years. We do not often stay after 6. I should like to give over at 6 always, and would not mind losing that money. That is what we all say.

180. *Ellen Marsden.*—Since I have been here, about two years and a half, we have generally worked from 6 till 6, neither earlier nor later, except in the last few weeks. I should like to give over at 6. I have been 10 years in bleach works. I liked the twelve hours Bill better than as it was. When we worked the long hours we were not kept agate so regularly.

181. *Mr. S. Isherwood* (Messrs. G. & J. Slater, bleachers, Dunscar), a partner.—For more than three years past we have scarcely lost any time. From about the end of 1864 to the end of 1867 we have always had more work than we could overtake, and have in this year at present. Indeed, we have such a store on hand that we have given many of our customers notice that we cannot take any more for a month. Some have to wait as long as 10 weeks for their goods, though in a general way they call them due in 10 days, and wish to have them then, or if specially wanted, in seven. Consequently we have had to enlarge our works. It is about two years and a half since the girls have made up any time in the evening. We have only a few hours to make up now, not enough to continue making up time for a week, so it would not be worth while to begin it.

In the actual bleaching part, however, work is always done before 6, generally by 5, and it is convenient to make up a little of this on Saturday afternoon, and as a rule it is done for half an hour or an hour, and sometimes up till 4 p.m. The Saturday is two hours shorter than other days, and consequently less cloth can be done on that day, *i.e.*, about a fifth less, and the effect is felt on the following Thursday, when the cloth comes out white. The women and girls, however, always leave their work at 2 on Saturday.

When we are going to make up time in the bleaching department on Saturday we give notice to the inspector on the Friday, saying how many hours have been worked in the previous week. The tickets of the time worked in each room are brought to me, and I enter them in this book.

We have done all that machinery can do to save labour and shorten the hours. It is to our interest to do so. It is found that women or girls get tired of working till 8 o'clock every night. Our cloths are heavy, averaging 20 lbs. a piece, and the girls would get tired working at them by hand from morning till night. We hook by machine, and we think it easier than hooking by hand in heavy cloths. One machine will do nearly as much as three hookers by hand in

our sorts. Each machine is worked by power with a shaft under this floor. Some bleachers could not do with machines, as they do not suit for the class of cloth they do.

If the law were altered so that we could not make up time, we should have to endeavour to adapt ourselves to it. But we think that it should not be altered, and that we are limited to as short a time as we can work to advantage. Our works are not a fair specimen. There are others which lose much more time, and it suits them to be able to make it up. There is a great outlay in machinery, and it is important for people to be able to get a full return from it. It is as necessary to be able to make up time when trade is bad as when it is good. In the time of the cotton panic people pushed us for goods quite as much as they do now. It is for the convenience of our customers more than of ourselves that we make a push. If we hurry things we are likely to spoil them, and the loss of this falls on us ; but if we cannot do them by the time wished, people threaten to take them elsewhere. If time could not be made up no doubt things could still be done, but how we do not *yet* know.

In the last few years the cost of bleaching has been rather raised. More has been required to be made out of the same cloth, and more labour to be bestowed on it. But the increase of cost is very slight, and not more than equivalent to the increase of labour.

Large quantities of Belgian goods are sent to England to be bleached, but I have not noticed this till about the last three or four years. We do more of the heavy goods than any bleacher in the trade, almost enough to entirely occupy a small establishment. The reason, I believe, is that the Belgians cannot bleach equal quantities to what they can manufacture, and their manufacture probably has increased of late. I believe that their finish is not so good as the English, and the specimens which I have seen were not so in my judgment. They cannot do it in quite equal style or one which will fetch quite so much money.

182. *John Collier*, Bolton.—I am president of the Bleachers, Finishers, and Dyers' Association. It was formed about two years ago. Our object is to obtain an alteration in our present law, and have the same limit of work as in the factories.

About a year ago a tea party was called to test the feeling of the workpeople. There were 1,200 persons present, a large number being women and young people, and many came in afterwards ; there would have been more if the place would have held them. The following memorial was adopted and sent up, viz. :—"To the Right Honourable Sir Horatio Wal- " pole, Her Majesty's Secretary of State for the Home " Department. The humble petition of the operative " bleachers, finishers, and dyers, in public meeting " assembled, showeth, That the second clause in the " Bill for the protection of females and young persons " employed in the above branches of industry is a " source of continual grievance, inasmuch as it allows " lost time to be recovered by working from 6 a.m. " to 8 p.m. for months together without intermission, " and rendering it extremely difficult for the inspec- " tors to detect cases of evasion, and therefore is " totally opposed to the spirit and benevolent inten- " tions of the promoters of the measure, and entirely " defeats the main purpose of the Bill, inasmuch as it " obviously interferes with the educational opportu- " nities of young persons and females, for whom the " Bill was specially provided. And your petitioners " will ever pray, &c."

We have had a Bill prepared which would meet our wishes. I produce a copy of it.

About last spring inquiry was made amongst the workpeople employed at several bleach works as to the hours worked to recover lost time, and the wishes of the workpeople. I took part in this. It was done in support of our Bill. But we understood that there was to be no legislation without further inquiry, so we thought it no use to go on.

Trade is now rather slack, and the full amount of hours is very often not made up. In many cases the average for the year is much below 60 hours a week ; but if trade becomes busy again, there would be great complaints.

The want of stopping regularly at a certain hour is what we complain of most of all. The factories have it, and we do not see why we should not. The workpeople would sacrifice almost anything to get it. We want nothing more than what the factories have, but we do wish to be able to know that we can have our own time in the evening. We have a strong feeling against the irregular hours. I shall not let my girls go into bleach works if the making up lost time goes on. I have heard numbers of men express the same intention. My objection is on moral grounds. I think that when trade begins to revive, and time to be made up more extensively, the bleaching masters will find some difficulty in getting girls unless the hours are made more regular, and I believe that some of them are of this opinion. In a slack time of course the girls are glad to go anywhere.

As to the lost time register, the workpeople in general do not know that any such books are required to be kept, and I have known a case even of a foreman who did not. The wages do not depend on the hours shown in this book. In the great majority of cases wages are paid by the piece. Even where they are not, they are not paid according to this register, but by a private book.

But we wish it to be understood that we are all very grateful for the Act, even as it is. It has done an immense deal of good. It has done away with a great deal of the evils which existed, and the night work. The effects are very marked. A great improvement may be observed in the appearance of the people.

The improvement as to education is also great. The Act has been a perfect godsend to many. The children attend school regularly, but when they get to 13 they cannot carry on their education properly if they are liable to be kept at work till 8 o'clock for so long together as they are. It cannot be said that their education ought to end at 13 ; but without the long hours being long continued, if the irregularity of work happens only now and then, it is enough to upset the chance of regular evening education. The youths do not know when they may be kept on or when able to attend school, or for what to take a ticket. I have known several cases where, from being kept only occasionally, lads have given up altogether, saying that they were paying for nothing.

It is true that we do not expect to lose in wages by the hours being limited to 6 p.m. We believe that the general effect of the limitation of hours has been to improve the trade and allow of its being conducted more economically to the master, and make the labour more efficient, and so to allow of an increase of wages. The amount of work done has, we think, been in no way diminished by it, but in this way increased, only being more evenly spread over the year. Our object in seeking for the limitation is not money. I am sure that the consideration of wages has very little influence in making the people so desirous of the alteration in the law ; it is simply the desire to have shorter hours and the advantages of a certain time for leaving work.

We are as much against anything which can injure the trade as any of the masters can be. We know that it would come upon us Their capital is at stake, but we have to make our living. But a 10 hours bill would be no injury. We know that by what has happened since the Act. I believe that most of the masters are satisfied with that now, and that none will dispute this. I believe that the masters have gained by the Act, because they can produce more in the same time, and also save coal, gas, &c. Wages are rather higher than they were. The increase in the rate charged for bleaching was attributed by the masters to other things, such as the rise in the price of coal, &c. The increase in the price of labour was

Bleaching, &c. Works. England. a.

not sufficient to account for it, and it was not so general as it would have been if caused by the Act.

There have also been great improvements in several ways, particularly in arrangements. More has been gained in this way even than by the improvements and increase of machinery; but there is still room for more improvement in the arrangements. The hands work in sets, and the work passes from one set to another. For example, under the old system before the Act part of the work would be all finished up at night, and then a set would have nothing to begin with perhaps till breakfast time. The work being piecework, the master did not care how long or how short a time the hands were there. With good management there is no occasion for these breaks. They are a great loss to the master. Now they manage to leave some work for all to begin at once. When work is busy these delays never occur; there is no waiting then. There are no doubt certain stages in some processes which could not be left incomplete, but these could be attended to by men, and the boys could be allowed to go. As to the finishing and making up department, in which the women and girls chiefly are, there is nothing which could not be left at any time.

It is seldom that there is any overtime in the bleaching. It is common to get the bleaching done for the day by 5, or at latest by 6, though in some cases it may be longer. In the finishing and making up the overtime is not from any difficulty in the process, but merely on account of the excess of work to be done. It might be got over in a great measure by having a few more hands, but more machinery also would be wanted. The finishing machinery, the mangles and calenders, is the most expensive part.

I have been employed in bleach works more than 20 years, and am now foreman in one of the finishing and making up departments at Messrs. Eden and Thwaites' bleach works, Bolton. They keep very regular hours. They do not avail themselves of their privileges so often as I think they might. They have a large and increasing business.

183. *John Waring*, Bolton.—I am secretary of the Bleachers, Finishers, and Dyers' Association. I was employed in bleach works for many years, up till the time of the inquiry before the Bleach Works Act was passed, and was examined then. I am now in a factory, but I have continued to take an active part in proceedings on behalf of the workpeople in bleach works, and am fully acquainted with the present state of things in bleach works generally in this district. It is my business as secretary to make myself so, and the facts are constantly brought before me by the workpeople themselves. Where I am now I have more time and opportunity for this than if I were actually engaged in bleachworks.

We always contended for the 10 hours bill. The Act, as it was passed, with the power of making up lost time, is in effect not a 10 hours Act but a 12 hours Act. The common saying amongst the workpeople is, that they have been agitating for years and spending a great amount of money to get a 10 hours bill, and when they thought they had got it, they find that they can still be employed from 6 a.m. till 8 p.m. for months together. The fact is the law is so loose as to the making up lost time that the inspectors have no hold over the hours worked for this. Only one case, I believe, has happened in which there has been a conviction for making up more time than was allowed. This case, I understood, was only proved by the lost time book having been correctly kept. If it is not so, there are no means really of proving that it is not.

I believe that the present state of the law is not satisfactory to the masters, *i.e.*, to the respectable and upright who wish to obey it. Complaint was made to me from one firm as to how it was that at a neighbouring bleach works they worked so often till 8 o'clock. I said that the only thing was to call the inspector's attention to it; but I believe that as the law stands it is impossible for him to check such things.

The question, I know, is only as to the law as it stands, and not whether it is broken. But the power of working till 8 gives greater facilities for breaking it than working only till 6 would. If work stops regularly at 6, the people are seen coming home; but at 8 the inspector is not supposed to be out, and there is less risk in working on past 8. I have seen boys and women coming out from bleach works after 9 o'clock. I have spoken to them, and they have told me that they have been working up till that time. This is in works which lie out of the town and away from observation. We do not, however, now complain of such things as this, which are plainly breaking the law. What we want is a law for working only fixed and uniform hours, the same as in the factories. The mischief is that the people never know when they will have to work.

In the former Bill we wished to include a requirement that the wages of women, young persons, and children should be paid weekly. This was because in bleach works in the Bolton district wages were paid monthly or fortnightly. Fortnightly payments have now become much more general, and this has been a great benefit to the working people and is greatly appreciated by them. There are scarcely any cases in which they are paid weekly in bleach works in this district, though in the Manchester district I believe they are so. But we know that the Factory Acts do not provide for this, and we do not seek for any legislation on this point; we do not seek for anything more than the Factory Acts contain.

The power of working at night to make up time lost by want of water power is very seldom, if ever, exercised. I have never heard of any case of it. I should almost certainly know if it were the case. All the bleach works in the Bolton district, I believe, can now go by steam power alone.

Coals have become dearer since the Act, but there has been a great saving in the quantity used. This is partly from the engines not running so long, and partly also just of late by using economizers. These are being put down at many bleach works.

When the Act was passed some masters sent away the children, but now children are being employed in several places. It is necessary to keep some to train up, otherwise they cannot be got when they are wanted older, as they are gone to other work.

The proportion of women, girls, and boys employed in bleach works is about the same as it was in 1854, I should say. The total number of persons is probably rather more. There are, I should say, about 3,000 in the Bolton district, and only about a third of them adult men. The average number of persons in any one place is, I should say, about 100 or 120; 60 is small.

184. *John Collier and John Waring* (continued jointly).—Our great principle is to have a fixed limit of work like the factories, viz., that women and young persons should leave work regularly at 6 o'clock, and on Saturdays at 2.

We believe that many of the objections alleged before against applying the Factory Acts to bleach works have been removed or much lessened since. There have been great additions and improvements in machinery in the last few years, more so than before, and a more general adoption of known improvements in different ways. Masters had to prepare to meet the Act, and most, we believe, have made what alterations were required.

From what we have heard we believe that, notwithstanding what may be said by masters, they will not make any serious resistance to the principle of the Factory Act limits, at any rate any at all equal to the opposition made to the present Act. Then they had no experience of how any legislation would work. It was then entirely a matter of speculation only for this trade. Now they have had an opportunity of seeing, and are satisfied, we believe, that they have not been injured by it so far as it has gone. No good reason can be shown for believing that the far smaller change which we now seek will act in any way differently from

what the past legislation has done. One great objection made then was to inspectors. This ground of objection cannot exist now, as there is inspection. We believe that in time the masters will come to approve of the limitations as they do of the present Act.

Part of the opposition now expressed to legislation arises, we believe, from the belief that the question has been raised in consequence of supposed violations of the present Act in respect of making up time improperly, not from thinking that the trade will suffer.

We have reason to believe that some masters would have no objection to the Factory Act. The majority, however, would like to keep their present liberty. The Messrs. Ainsworth, who are, we suppose, the largest and most successful house in the trade, always work the regular hours, viz., 6 a.m. to 6 p.m., as to women and young persons. They are probably the head firm in the kingdom. They are very regularly employed, probably no firm more so. Such cases are the best proof that there is nothing impracticable in the Factory Act in this trade.

Though we say that we are for the Factory Act, we do not want any of the details which are troublesome to the masters, and yet not necessary in themselves; we mean such as whitewashing ceilings, fencing machinery, &c.

There is a general feeling of dissatisfaction amongst the workpeople at the making up of lost time, and a distrust that more time is made up than is lost. From information which we receive we have no doubt whatever that more than the legal amount of time is in several cases made up. We do not see how this can be prevented till the law is altered. Any changes in the way of keeping an account of the time worked, with a view of making it more effective, even if they succeeded in this, would not give the required satisfaction. So long as the power of making up lost time remains there will be no satisfaction. We feel assured that this agitation will never cease till the hours are made equal to the factory hours.

We have considered whether a law abolishing the making up of lost time, but allowing work till 7 p.m., could be accepted as a compromise by the workpeople. We do not think it would. If work till 7 o'clock was allowed, it would be required whenever there was sufficient work. This would leave the workpeople in bleach works in a clearly much worse position than those in factories. We should think that Parliament would not sanction such a marked difference. We should prefer things remaining as they are, and would sooner postpone the question. If we accepted anything less than the Factory Act it would diminish our hope of ever getting the factory hours, or at any rate it might put it off for a long time. Our best hope is to try for the factory hours now when they have just been extended to all trades in the country. This makes the present a proper time for settling the question. If Parliament will give the workpeople this it will tend very much to keep up a loyal feeling amongst them.

It must be borne in mind that many of the workpeople will be afraid of expressing their real opinions or stating the real facts if they think that their masters will be displeased by it. They fear that they might be discharged. There are cases in which not only the man himself is employed, but several other members of his family in the same works. If he spoke what he knew and thought, the whole of these might be swept away. That is a great deal to expect a man with a family to risk. We believe that there is not much ground for this fear. On the former inquiry the masters behaved very honourably. Still there is such a kind of fear, and it is a fact to be borne in mind. But there is less of this now probably. People having shorter hours and more time to improve themselves would sooner go into other trades than submit to it.

185. *John Welch.*—I have been engaged in bleach works between 30 and 40 years, and am now employed in the making-up room at Messrs. Millard & Coward's bleach works, Heaton Mersey. The Act of 1860 has been a very great benefit to us all, and I do not believe that anyone has been injured by it. We do not hear of the masters being dissatisfied with it. The rate of wages has not been affected by it. The same money is got in less hours. The number of hands is not increased except the young ones. In our department it is all manual labour, no machines. Nor has there been any change to speak of in the other departments. We are often in them and know what is doing. There was less work during the cotton panic, but otherwise the amount done in a given period, say a month, has been in no way diminished. We can tell this from seeing how much work we get through. In bleach works wages are paid by the piece. Less time is lost *at* the work. The hands are less fatigued and can work better. Also, less time is lost *between* the work. The hands are kept closer at it. Formerly, sometimes they would be doing little or nothing for two or three hours in a day and waiting till 10 o'clock at night after all. In a busy time there is very little delay of that kind now.

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There has been a great improvement in the general health of the workers, especially in the case of the girls. That must be patent to anyone who observes at all. They used to suffer chiefly from weariness, languor, and sore feet. We do not hear complaints on these points now.

Our complaint is, that we have been all these years striving to get the Factory Act, and when we thought we had got it, we find that we still have only a 12 hours bill. Regularity is what we desire. Now there is no certainty. Whenever there is much work wanted we know that there will be work after 6. It may be one night, two nights, or a week or two, or month or two together, up to any time from 6 p.m. to 8 p.m. If there is much work on hand the people would expect to be kept, but they do not always know before they come in the morning. There may be work till 8 one evening and till only 4 the next day, or late work for some days and then several days with very little work. This happens constantly.

We workpeople think that a great deal of this might be saved if it were wished, and there were occasion.

We should not wish any loss to fall on the masters, or the trade to be injured, we only wish the work to come more regularly. Then the wages would come more regularly too. There is no doubt this would be the case. Changing the hour from 8 to 6 would be nothing like such a change as the Act made, and that has not diminished the work. The fact is the cloth is kept lying till the last moment before it is sent to the bleacher. If it can be got back in say seven days it will often be kept till then. If it were necessary it would be sent a day earlier.

We do not know or concern ourselves anything about the time which has been lost; we have no means of knowing.

Children are employed as much as before the Act, or more in fact, there being two sets. They get the benefit of half time school, instead of being at work as they often were till 10 or 11 at night.

The night schools in our village are well attended, and the bleaching hands as a rule avail themselves of them very satisfactorily. This justifies us in thinking that they would do so still more if it were not for the interruptions arising from the irregularity of work. Our young people generally are growing up now much better informed and more anxious for improvement than formerly, and there is, I am happy to say, every promise that these things will be more attended to now.

186. *Joseph Booth.*—I am the local secretary, *i. e.*, in the Stockport district, of the Bleachers' Short Time Association. I am employed in the same works as John Welch, and have been there 14 years. I agree with what he has said. There are but few bleach works and one dye work in our district. The workpeople in all these support the object of the association.

There is no difference of opinion amongst the men. All want the Ten Hours Factory Bill and nothing more and nothing less. If they get that they will be entirely satisfied.

Besides the night schools there are other things which young people wish to attend, such as singing and lectures. Though they may be kept late they will go to these after they have done their labour, only they have lost that part of the evening. These classes are very well attended; I know most of those who go to them as I attend them myself.

187. *William Hart.*—I am maker up at Messrs. T. R. Bridson's bleach works, Bolton. We are pretty regular. I think we average about the time, taking the year round; seldom more than a fortnight short.

I have a large family of girls. I had one of them in bleach works, but I thought it would be better to send the others into factories; the work is more regular and they can earn more. But we want our children to be something more than merely workers, we want them to be something domestic. I will venture to say they are as busy as possible at home now, with work or sewing, or something. They are from 12 to 21 years old.

My boy is in bleach works. He goes to school at night whenever he can, but sometimeshe is kept at work.

188. *John Knowles.*—I am in the drying department at Messrs. Eden & Thwaite's bleach works, Bolton. We have occasionally made up time, but little of late.

I feel just the same as William Hart about my girls. I should prefer bleach works to a mill if it were a ten hours' bill; but while I have any control over them they shall not work in a bleach works otherwise, and I believe that this is a general feeling amongst all intelligent men in bleach works. It is for their (the girls') sake; girls are injured by it (the present plan). One of my girls is 17 and goes to a mill, the next 13; I intend sending her too as soon as she is ready for full time; I like to keep her till then if I can. Independent of the wage question, if there were a ten hours' bill I would prefer bleach works for her. I think the mother ought to have them under her care in the evening.

I can speak as to the effects of the fetching up lost time. I have asked boys in the village in which I live if they go to night school and they have told me that it is no use, as some nights they are kept at work in bleach works and cannot go. I believe this to be the truth and not an excuse. They were boys I knew personally and should believe them.

189. *Messrs. Millard & Coward*, dyers and bleachers, Heaton Mersey.—(Answers to printed form. Messrs. Millard & Coward are also spinners and weavers.)

Being bleachers and dyers for hire we have no control over the supply of cloth and yarn on which to work, and which is irregular—at one time not being sufficient to keep the works employed half time, at others in excess and more than can be done in the 10½ hours per day. If in reply it is assumed that we might obtain the materials on our own account, we should then become merchants, and have interests clashing with those of our clients, and in addition undertaking a business totally unconnected with our normal one. The irregularity of supply above referred to is the objection to our being placed under the Factory Act. The present Act provides for that irregularity and has worked well.

190. *Mr. R. Heywood*, bleacher and finisher, Adelphi, Salford.—(From answers to printed form.)

(1.) We have not averaged 10 hours on the days we have worked since the present Act came into operation (holidays, &c., not included).

(2.) The whole of the time from 6 a.m. to 8 p.m. is not equally valuable to us owing to the fluctuations in the trade, &c., so that any portion of it taken away would generally be so much of a direct loss as it is seldom all the departments can work at the same time, so that if the nature of the work required one department to work an hour or two longer than the others, and that time was forbidden, all the other departments on the following few days, some on one and some on another, would have to lose the same time.

(3.) We ought to be allowed to work about 10 hours a day, and to meet the nature of the trade we should be allowed to use any part of the day from 4 or 5 a.m. to 8 or 9 p.m.

(5.) (Contains a suggestion, as a less restriction on trade, for limiting the average quantity of goods got through instead of limiting the hours of work.—J. E. W.)

191. *Mr. J. L. Barrett*, bleacher and finisher, Pendleton.—(Answers to printed form.)

Having water power only we are frequently stopped by floods, and occasionally for want of water. The time allowed by merchants for the return of goods entrusted to us is frequently so short that we are unable to finish them in the time required without working overtime.

Any further restrictions on our trade would have the effect of driving workmen away from us into other branches where the demand is more uniform.

192. *Messrs. J. Mather & Son*, bleachers, dyers, and finishers, Crow Oak, Radcliffe. — (Answers to printed form.)

It would be very inconvenient if not allowed, as our trade ought to be very brisk at two seasons of the year, and is certain to be slack. If we are not allowed to fetch up lost time we should lose our customers, and that would cause us to be still slacker of work in the flat season and our hands would not stop with us. We consider the present plan better than any further alteration would make it. All the bleachers and dyers of piece goods in Lancashire that we know of work upon other people's cloth, consequently when they are short of work and compelled to stop their works, they cannot like a factory work for stock to sell at a futuretime.

193. *Messrs. J. Appleton & Co.*, bleachers, dyers, and finishers of cotton goods, Turton.—(Answers to printed form.)

(1.) In our experience we have found it impossible to keep the hands fully employed during the usual working hours all through the year, in consequence of the fluctuations in trade, want of water, local as well as general holidays, &c., and we therefore consider it expedient, both on behalf of employers and employed, to have the means of recovering a portion of the time unavoidably lost under the above-named circumstances, subject of course to the clause in the Bleaching and Dyeing Works Act limiting the employment of females and young persons within the hours of 6 a.m. and 8 p.m. For more full particulars on this question we beg to refer you to the Time Register, Schedules A. and B.

(2.) We think the causes of the irregularities in reference to the first question are peculiar to our branch of trade; therefore believe that if placed under the restriction contemplated would put our trade under greater disadvantage than factories.

(3.) An allowance for recovery of lost time as now provided.

194. *Mr. G. Murton*, bleacher of twist and thread, Sharples.—(Answers to printed form.)

(1.) The work of bleaching can only be done when the materials to be bleached are furnished by merchants; consequently at some seasons the work altogether ceases and the workpeople are idle. It is after this cessation of work that the workpeople are required occasionally to work overtime.

(2.) It would affect the workpeople directly. They must at times be short of work, when their wages cease; and if not allowed to recover any portion of lost time they would have no chance of recovering any part of their lost wages.

(3 and 5.) The employments of factory operatives and bleaching workers are so essentially different that it would be extremely difficult to assimilate the laws. The factory master or employer can always continue his work in a regular manner (even though without orders) so long as he has capital to furnish

the raw materials for working. But so soon as merchants, from any cause, cease to send out materials for bleaching, the bleacher must cease to work; he cannot find his workpeople employment for a single day. There is no doubt but that the Bleaching Act has hitherto been highly advantageous to the workpeople by preventing night work for females and young persons; but it is very doubtful if the Act was carried further, and was altogether to forbid recovery of lost time, whether it would not have a tendency not only to deprive the workpeople of part of their wages, but also to drive the trade of bleaching to other countries of Europe, where there are no restrictions as to time. At present the trade is only retained in England by the exercise of the greatest care and economy. Any legislation that would entail a greater time in the operations of bleaching, by taking away the power of recovering lost time as at present enjoyed, or would raise the rate of wages in consequence of the lost time that must occur, would be a boon to foreign bleachers, and would make it even more difficult than it now is to stand their competition.

195. *Mr. E. Schunck,* bleacher and dyer of cotton yarns, Butterworth. — (From answers to printed form.)

(1.) Seldom exceeded, and unavoidable when exceeded, as the work given to bleachers and dyers is irregular in quantity, and little time given in which to return it.

(2.) It would affect me by preventing the recovery of lost time incurred by deficiency of work owing to the fluctuations of trade which spinners and manufacturers who are under the Factory Acts are not subject to, as they can work to stock which will sell some time, but a bleacher and dyer cannot stock, but work only as he gets work to do, which may be enough for 16 hours a day one week, and the next week for four or five hours a day. Any limitation of the recovery of lost time is a loss to the capitalist, to the employed, and a boon to the foreign competitor, who has no restrictions of his hours of labour, and most of the yarn bleaching done in this country has to compete with him in foreign markets.

(3.) The Bleaching and Dyeing Works Act is already stringent enough, and if any alteration be made, it should be for young persons to commence working at 12 years instead of at 13; and all young persons over 12 years of age, male and female, be enabled to recover lost time, lost by fluctuations in trade. The employment of bleaching and dying cotton yarns is not in any manner injurious to the health of the persons employed in it, and the work done by the females is the cleanest that females have to do in the manufacturing districts of this country.

196. *Messrs. Jackson & Ashworth,* bleachers, dyers, stiffeners, calenderers, and finishers, Smedley Bridge. —(Answers to printed form.)

(1.) To break off work exactly at 6 in all departments would cause considerable loss, or for some departments to leave work much earlier, as we could not get the work into a fit state to leave in all cases.

(2.) Injuriously. We now employ men where lads would do as well (though we are not averaging full time), to avoid having to stop some machinery, say for tea time, when by working a few minutes (say 15), our work would be in a position to leave till morning.

(3 and 5.) When goods have to go through several processes, some in a wet state and some dry, and also through various colouring matters, there should be as much latitude given as possible, without allowing injuriously long time for work; for instance, lads who do not start work till 8.30 a.m. or 1.30 p.m., might work till 8 p.m., or in the latter case, till 6.30 without being compelled to stop half an hour for tea time.

197. *Messrs. Whittaker & Harwood,* silk dyers, Heaton Vale.—(Answers to printed form.)

(1.) Yes; because silk is very expensive, and if not attended to at the proper time in each process will spoil, and being so expensive, involves too much capital for the silk manufacturers to let it be out long.

(2 and 3.) The silk trade, being a fancy trade, it is very fluctuating, sometimes very busy, sometimes very flat. It would be, therefore, very difficult to legislate on this question. Probably, take the year round, we might make something like full time, viz., longer hours when busy, and shorter when flat.

198. *Mr. H. Williams,* raiser, stiffener, and shearer, Brown-street, Salford.—(Answers to printed form.)

(1.) The usual hours are rarely exceeded, and then only to work up lost time. The excess is unavoidable on account of the irregularity of our business.

(2.) We think the Act under which we work is quite stringent enough without going to the Factory Act; we cannot, like the manufacturer work to stock, but only when the merchant makes his purchase and therefore subject to great fluctuations and season trade.

(3.) We think, as no great amount of overtime will ever again be made, all hands should cease to be a "young person" at 16, instead of 18 years.

(5.) The competition on the continent of Europe is so severe (where there is no Factory Act), that our goods are there finished at much less cost, are sent abroad often in the "unfinished" state, and even when finished, there have been cases where they have been re-shipped and sold in this country; the fluctuation in our trade is so great that one week we may be full time, and the next only two days per week.

199. *Mr. Thomas Schofield* (of the firm of Messrs. Joshua Schofield & Sons, fustian dyers, Cornbrook). —I have always been of opinion that it is not desirable for the ordinary day's labour to exceed the limit of 12 hours, and we have always endeavoured, as far as practicable, to keep our work to this limit. It is for our interest that we should do so; but owing to the peculiar nature of our trade and our dependence on customers who have to provide us with the goods for all our employment, this is not always practicable.

I expressed my views on these points to the commissioner who inquired into bleaching and dyeing works just before the passing of the Act under which those works are now placed. I see little to alter in my views as then expressed, but have become more practically convinced of the importance of being allowed to make up for lost time so as to meet the peculiar exigencies of our trade. As far as possible we reduced the number of lads under 18 years, and employ none under 13 years, so that we only have about 50 under 18 years and 150 above 18 years.

For some years after the passing of the Act its real effect could hardly be judged of as, owing to the scarcity of cotton, our trade was so slack that as a rule even the 12 hours were more than was required. The trade, however, is now returning to its former state, sufficiently so, at least, to allow of a judgment being formed as to the effect of the Act.

I think that the Act has not been any injury to our trade, but on the contrary a benefit, as it has led to greater attention being given to economising time, and thus to the same amount of work being produced more regularly and in shorter hours, which is clearly a gain to us. We are well satisfied with the law as it stands, and I believe that this is the feeling of employers generally.

At the same time the liberty which we have of making up lost time has been a great benefit to us, and I think that it was a wise conception. I took an active part in support of it when the Bill was before Parliament. We use this liberty when we have occasion, but not more than for during about six weeks in a year. Even in these cases, however, we dispense as far as we can with the younger boys.

About 10 women and girls are employed in ending and mending the pieces; none in other ways. It is sometimes convenient for us to keep them so employed till 8 p.m. when there is a pressure of work. If they were not allowed to work late here, they could take their work home and do it there, and they can work here quite as comfortably as at home, probably more so. So nothing would be gained by preventing them from working here after 6 p.m. It is true that it

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would be less convenient for us to have their work done out, and it is for this reason that we have it done on our premises. But we should send the goods out to them if we really required it.

It is said that working longer hours when there is occasion does not really increase the amount of work done on the whole, but merely takes it from being done at another time, so that nothing is gained in the end. This is not the case. Those who understand trade know that any obstacle put in its way which prevents a thing being done when it is wanted, tends so far to diminish the amount done at all. People not acquainted with trade probably cannot understand this, and even people in trade cannot tell just how it happens, but experience shows them that somehow or other it is the case.

To some extent when work cannot be taken by one employer it may go to another who is less occupied. But the worst of this is that when once a customer has done business with another person instead of the one whom he usually employs, there is a likelihood of his continuing transactions with that other person, so that the first may lose that customer's business not only at the time, but for the future also, to a great extent, if not altogether.

The present Act nominally allows of working beyond the factory hours only to make up lost time. It is, however, certainly true that in effect it allows employers to work up to the wider limits whenever they find it expedient to do so, because of never running full time (between 6 and 6) for six months together. An inspector has practically no hold over them in regard to strictly making up for lost time only, consequently the law may not be carried out rigidly. This may not be a desirable state of things so far as the law itself is concerned, but practically it works well, giving us that amount of elasticity which, in my opinion, a trade such as ours fairly requires.

The question of restrictions on employment is of more importance to us now than ever before. In the course of business I have become conversant with what is being done by other countries as regards our trade, having for many years been more or less in communication with the merchants, manufacturers, and dyers, and finishers in France and various parts of Germany; also, having visited some of them and gone into the cost of producing the goods in those countries. I found the mills and works chiefly filled with the best machinery from England, labour much cheaper, and in Germany they work when busy 16 or 17 hours per day, or, in other words, they suit themselves according to their orders, so that seven years ago their cost of dyeing and finishing was as cheap as ours. It was only in the manufacturing where this country had the advantage, and this chiefly arose from not being able to manipulate the cheaper cottons as well as in England. Since this time in consequence of being obliged to manufacture with the cheaper cottons they have much improved, and I believe the difference in cost now is very little. This is proved by the small trade now done in our class of goods with the continent, though the duties have been reduced both in France and Germany; with the latter country a large trade used to be done, but year by year it seems to be growing less. The reason is, that they are producing the goods themselves and cheaper than they can be imported from this country. These facts have strongly impressed me that this country must be careful not to carry its restrictions in trade too far.

All the trade similar to ours, dyeing and finishing of fustian goods, is wholly carried on in Manchester and its neighbourhood, and will employ about 3,000 hands, to which may be added about 2,000 fustian cutters, and also the great number employed in the manufacture of the goods, and this will show the great importance of the trade. The quantity of trade done since the cotton crisis has much diminished, having been much dependent upon the foreign trade. The trade with America has almost wholly ceased, and our trade with the continent is much decreased and decreasing, as before mentioned, so that it is most important for the legislature to do nothing which will tend to enhance the cost of production. I believe you will find my remarks will be fully borne out by others in the trade, and that further restrictions are neither necessary nor desirable.

(*Mr. Schofield afterwards wrote.*)

I may say, since writing to you I have seen most employers in our trade, and I find they all fully agree in the general tenour of my remarks, all being very strong upon the subject that further restrictions are unnecessary and would be injurious.

200. *Messrs. J. & J. M. Worrall*, Ordsall, Salford. —[Work carried on:—Dressing and bleaching, dyeing and finishing fustians, cotton velvets, silk velvets, and mixtures. About 670 persons employed. Of these only a very few are females, viz., 25 girls and women, "all employed ending and mending velvets "and velveteens; cutters cause holes which require "sewing." Of the males fully two-thirds are adults over the age of 18; and of the rest, all but a few messengers and office boys are young persons described as employed in watching machines. Limit of excess of usual hours, 8 p.m. Summarized from return to printed form.—J. E. W.]

(1.) Unavoidable. Orders are for different markets and seasons, and must, if possible, be finished in the time required, causing overtime one week and short time next week. Full time has not been made, but short time on the average during present year.

(2.) Affect a personal comfort and convenience but be prejudicial to the trade. Foreign competition is now felt, and may become ruinous by restrictions upon the free use of our machinery and works.

(3.) The Print Works Act and Bleaching, &c. Act. Employers and employed would be both benefited by the Factory Acts if it will not drive the trade to other countries. The season trade affects dyeing and finishing. Manufacturing is more regular, and goods can be made for stock, but must be finished for season and demand.

201. *Messrs. G. Whyatt & Son*, fustian dyers, shearers, and finishers, Openshaw.—(Answers to printed form.)

(1.) During the present year we have not made any short time, therefore we had nothing to fetch up with young persons under 18 years of age; but we have made overtime in consequence of the work we have had being wanted, and were compelled to work those over 18 years of age overtime. [Accounted for below. See No. 202.—J. E. W.]

(2.) For the last seven years the time made by our hands will not average more than four days a week, and if any alteration was made to prevent young persons under 18 from fetching up lost time, we should have a difficulty in getting them, as they would sooner go to the cotton mills, where the time is more regular. A cotton manufacturer can work on stock, and we can only work to order on goods sent down to our works.

202. *Mr. John Marchington.*—I have the sole management of this business. The trade is on much the same footing as it was 10 or 12 years ago. The only change of importance has been the introduction of finishing machinery seven or eight years ago.

The trade fluctuates very much. For the past year, however, we have been fully occupied and lost no time, and so have not been able to work young persons under 18 beyond 6. But we have been exceptionally fortunate, as a kind of goods has been in fashion in which our finish is apparently regarded as superior. In ordinary years we make up time, it may be for 15 to 20 weeks together.

The fustian dyers and fustian cutters are, I should say, equally affected by the fluctuations. Everything that is dyed by the former in pile goods has been first cut by the latter. The merchant buys the goods from the manufacturer and sends them, first to the stiffener, then to the cutter, and last to the dyer. He does not usually send them out for these processes till he has an order. It is important that the goods should not be dyed and finished beforehand. It is uncertain what

colour or style may be wanted, and they would lose their freshness of appearance and a kind of bloom on the surface, which makes them much more attractive and saleable.

This is one of the three or four largest fustian dye works, and employs about 470 persons.

203. *Mr. G. H. Midwood* (Messrs. G. H. Midwood & Co., manufacturers and dyers, Ancoats Bridge).—We are manufacturers of cotton goods, and our business includes also dyeing part of the yarn or cloth. Our manufacturing and our dyeing are both carried on on the same premises, and it would be inconvenient to work the dyehouse longer than the mill. Our dyeing, therefore, is practically regulated by the provisions of the Factory Act, though all but two of the persons engaged in it are men. Our manager's statement is correct.

It is true that cotton factories do all sometimes what is called run short time. This is either by working only a certain number of days in the week, say three, or only a certain number of hours in the day, or, as is more commonly done, by stopping a portion of the machinery and only running the remainder. Of course during the American war there was a good deal of this, and in many cases an entire stoppage of work. Short time also prevails to some extent in certain states of the market. But as a general rule it is, I believe, much more talked about than really practised. The threat of resorting to short time is sometimes held out as a means of checking an artificial rise in the price of cotton caused by speculation. Of course prices may be such as to make it necessary. But the loss caused by short time is so great that it is avoided if possible. All the fixed expenses are running, and the capital sunk in the mill lying idle, besides the loss of production. Of course there are other trades, such as the iron trade, in which short time cannot be avoided, but the loss probably in their case is not so great as in a factory. Also, if we make short time we cannot make it up afterwards by working longer hours. No doubt work in cotton factories is carried on more profitably through being thus more regular than in other works, bleach works for instance; and so far as legislation has helped to produce this regularity, as no doubt has been the case, it has been a benefit to the trade.

204. *Mr. John Clegg*, manager.—This is a cotton weaving factory, but contains also a department for blue dyeing, *i.e.*, indigo dyeing, required for part of the goods. This department works only the same hours as the factory part, though, with the exception of two boys, it employs only men. It is more convenient to work both only the same hours.

The time in which any one part of the cloth or warp passes through a vat is regulated according to the strength of the dye, but is generally from four to six minutes. The time required for the whole length is of course much greater, and depends on the length of the warp or the number of pieces which are joined together, which is done by passing a wire through their ends. There are all lengths, according to the order. A warp will run from 100 or 200 up to 1,000 yards, and the pieces are joined so as to form equal lengths. A length of 1,000 yards would take say an hour and a half, and so one of 500 yards, which is about the average, half that time. After passing through one vat the cloth or warp has to lie at least 20 minutes, and then be passed through the next of the set and so on. It is generally about 24 hours from the time when a set is started till the time it is completed. The men generally arrange so as to come to the end of a length by the meal time, and always so as to do so before 6 o'clock, and generally finish by 5, and then rake up the vats. Each time after a vat is used it has to be primed with fresh drugs and these and the indigo have to be raked up, and the vat left to clear before it can be used again, which is commonly not less than 24 hours.

If there were a great length to be dyed and little time to do it in this could be managed by putting it into the strongest vats and quickening the engine; but this would be too costly to do except very rarely. When there is not much to be done, we can take more time and work the weak vats out.

The boys' work is at the drying machines, and sometimes holding out pieces, if wide, to keep them straight as they pass through the vats.

205. *Mr. William Hampson* (Mr. J. Bentley, finisher, South Junction Street, Gaythorne, Manchester), manager.—This house, if not the largest, is at any rate one of the two or three largest of what are commonly spoken of as finishing houses or works in our branch of trade, in or near Manchester, of which there are about fifteen, and employs from 130 to 140 persons. There are other kinds of finishing works which are not included in this branch, *e.g.*, works for finishing fustian, delaine, cloth, and silk, but most of the fustian finishing works are dyeing works also and are spoken of as dye works, and there are but very few of the other three kinds. This business is chiefly in cotton and linen, and in a less degree, woollen goods. The work here is divided into three departments, viz., (1) calendering, (2) stiffening and finishing, (3) making up. Only men and boys are employed in it, as I believe is the case in nearly all the other finishing houses in our branch; I only know of one which employs females. Delaine finishing works employ females. A large amount of delaine finishing is done at Bradford.

The number of finishing houses in our branch has increased of late years. The scarcity of cotton during the American war made it necessary to give more attention to finishing in order to make up for the inferior quality of the materials, also the tendency of trade has been to require more finish.

Finishing was always a very uncertain and irregular work, and the hours of work used often to be very excessive, *e.g.*, till 12 o'clock at night or all night, while after these great pushes there were intervals in which there was very little or nothing to do. There has been a great improvement generally in this respect of late, and in our own case, owing partly to a greater amount and variety of work, which enables us to put aside some which are less pressing in order to complete those which are more so, and to take the others afterwards, we have comparatively very little of those irregularities now.

Though the Finishing Works Act affected directly only the labour of the boys, still its effect has been very much to reduce the hours of the men also, and so to make the work more regular, which is a decided gain.

Still in such a trade as ours it almost always does happen that some work must go on after 6 o'clock. This is caused by things being sent so late and constantly wanted back on the shortest possible notice. Goods sent to be made up are frequently wanted back in an hour. Our vans go round several times a day to deliver and to collect them from the warehouses, and the last van is generally in by 7 p.m. Things will come in by this which are wanted to be sent out by the first delivery next morning, and this cannot be managed unless they are begun over night. Occasionally a van has to wait out for things much later, it may be till midnight or longer.

The work after 6 o'clock is done only by men or youths over 18. We never make up any lost time with the boys, or keep any account of it, and I believe that very few, if any, of the finishing houses in our branch do so. I do not know of one that does. The fact is that we lose so little now. If we lost much time we should of course be glad to make it up. When the boys leave work and there is still much of their work to be done, some of the hands over 18 from other parts of the work which are not pressing take their place. This of course is a great increase of cost, for the boys would get only from 1*d.* to 2*d.* for an hours overtime, while the lads over 18 get 3*d.* or 4*d.* The effect also of these elder lads knowing that no one else can be employed late has been to enable them to get higher regular wages.

This places finishers at a great disadvantage as

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compared with persons who are merely makers up, and who can employ boys over the age of 14 any hours they please. Nearly the whole of our boys, of whom there are from 20 to 30, work in our making-up department as hookers. This is exactly the same work as is done by boys in warehouses, but the law respecting it is entirely different, and works very unfairly.

This distinction is unreasonable. Either finishers should be allowed to work boys the same as the warehouses can, or the warehouses should be put under the same regulations as the finishers. This is the universal feeling of the finishers.

The distinction is also absurd. If instead of the boys hooking here in the works, a room were fitted up for them across the road, on premises belonging to these works, they could work any hours. There is nothing to prevent such a thing being done in order to be free from the restrictions, though I only know of one case in which it is done. But this shows the anomaly of the law.

I believe that no warehouses finish, though I have understood that it was intended, if not attempted in one case, but given up to avoid coming under the Finishing Works Act. The same reason would, I suppose, prevent warehouses from using plaiting machines, as these require steam power.

The plaiting machines save a great deal of labour. They will do work which the younger of our boys could not do, and one will do, I should say, fully as much as three big lads. It saves therefore a good deal of space also. We have five. We had the first, I believe, which was used in this business in Manchester, which was about six years ago. They have come into much more general use since then, and as I have had the opportunity of knowing, are just now being more generally adopted in print works.

Some of the men here are called "stitchers," They stitch the pieces at the ends with a needle, to hold them in place. This could be done by girls, but we do not like to mix the sexes.

These works are a fair specimen of other finishing works of the same kind. The wages are paid weekly.

Personally I wish that there could not be any late work. We cannot avoid it, as things are sent so late, and must be done so quickly. But it might be avoided if those who send us work would make their arrangements a little earlier. A common cause of pressure is that goods are wanted to be ready to go by a certain ship. It is well known some time beforehand when the ship will be going. If the goods were but prepared and sent to us two or three days earlier, it would be a great benefit. Again, it is to the merchants profit to put off his orders as long as possible, in order to save a few days interest.

The printers say that their trade is a special trade. They certainly make ours a special trade by keeping things so to the last. If they would not take orders which could not be executed within a reasonable time without long hours, all their difficulty would be removed. They would not, I believe, lose anything by this. It would soon be understood, and orders would be given to them sooner, or people must wait. Printers are masters of the position, if they would but see it. Each has a different style, and as a customer wants this, he will wait for it. A print buyer can tell at once whose style a given print is. Something the same is the case with bleaching. But as it is, printers collect orders from different places, and wait to begin them till they have completed their lot. Hence part is thrown behindhand.

Our hookers frequently have gone to hook at warehouses after 6 o'clock, and can do so, there being no law to prevent them, if they are above 14 years old.

(*Mr. Hampson afterwards wrote*) "In reply to your "favour of the 9th, I beg to say that Mr. Bentley "has read over and agrees with my statement."

206. *Wright Astley*, foreman of the making-up department.—The boys under me never work here after 6 o'clock; there are about 20 of them, all between the ages of 13 and 18, and their work is hooking. It has been the case, however, that after leaving work here some of them have gone and done the same work in warehouses. I know this from hearing the boys speak of having done so. I cannot say how late they worked there, but should suppose that it might be till 9, 10, or 12. It is likely that they would work late as it would be in a busy time that they would be wanted there. Nor can I tell what they would get, but probably 3*d.* or 4*d.* an hour. When they have left work here of course they can do as they please; but I should not like them to go to work at other places, decidedly not. They cannot be equally fresh for their work here next day. This has happened in the case of boys from other finishing works also. This does not come within my own knowledge, but it is a thing well known. Only boys who are working in finishing or some other works as hookers could be taken on in that way; others would not be suited for the work.

The system of the work under the Act is much better than it was before. It is much better for the boys themselves and they can do their work much better also. It is very seldom that they lose any time now. When they worked the longer hours there were times in which there was nothing for them to do, but they averaged more hours' work taking the year round. They frequently worked till 12 o'clock at night. I think that work after 6 o'clock might properly be dispensed with in any kind of trade.

207. *Mr. John Dodd* (Mr. N. Dodd, finisher, Lower Moseley Street, Manchester).—We finish and make up goods, chiefly fancy dresses and woollen, and also make up large quantities without any finishing, just as warehouses do. This, I believe, is one of the largest finishing works. A great variety of machines are required to give different kinds of finish, and the styles of finish are constantly changing. The shearing machines, attended by girls, remove the loose fibres from the surface of cloth by means of cylinders fitted with blades revolving very quickly. We have put wire guards to these and have had no accidents since; some lost fingers before.

We generally expect to have two clear days to return goods in, but they are often wanted back the day after they are sent to us. Sometimes we have had goods waiting a long time before we can do them, *e. g.*, a month or six weeks, and sometimes they are finished long before they are wanted. The hands are sometimes not working at all, but waiting here ready for anything that may come in; sometimes they are off work altogether for days. We have less overtime than we did, because we have more machinery. Last year time was made up till 8 o'clock for about five weeks running in the early part of the year, and for two or three weeks later on, and only very occasionally besides.

208. *Mr. J. H. Moult*, finisher, Granby Row, Manchester. (From answers to printed form.)

The finishing trade is essentially of such a fluctuating and precarious nature that it would in my opinion be unjust, unfair, and arbitrary to place us under the Factory Act. We cannot work for stock like the factories, but are compelled to keep our places standing still, waiting, often until midday, until work arrives, which is then to be done at once, as orders are very peremptory as to the amount of time allowed to us.

If we do not execute the orders within the specified time allowed us we lose the work altogether, and the goods are shipped or sold without being finished, entailing a serious loss upon us.

My hands have not averaged 60 hours attendance per week since I have been in the business (10 years); last year, 1867, the average attendance was 50 hours per week, but the time actually worked was only 46 hours per week on the average, and it was a good year for my business. The trade is a healthy one and the hands obtain good wages. If we are placed under the Factory Act it will be aggravating, inconvenient, and a serious loss, and will take a good slice off an income in a business which at the best is but mediocre. It is not a business which will make a fortune, and the

difference between being busy and being slack is simply that of making a good living or a poor living.

209. *Additional statement by Mr. Moult.*

My business is a peculiar branch of finishing. It is called "moranding," and consists simply in stretching cloth. It is carried on only by five other establishments in Manchester or the neighbourhood, but in connexion with dyeing or other finishing. It is subject to great uncertainty and suddenness of orders, which I believe are common to the whole finishing trade, including both the stiffening and calendering. Things are sent in to us at very short notice and are frequently wanted in a few hours. A matter of an hour, which our present Act gives us, just makes the difference whether I am able to complete an order or not. For example, yesterday a large order came in at 5 p.m., and was wanted by 12 to-day. I asked to be allowed till 1, but my customers would not have waited till then, so last night we made up an hour and a half and I was able to deliver the goods by the time named. If I could not have made up this time I should have lost the order. Commonly I do not make up time beyond 7 p.m., but without stopping for tea. This is better than working till 8 with tea, as it allows of a clear break from 2 till 7 with no time lost in stopping. As mine is the only place in which my business is the only work carried on, I should be in a worse position than others if we could not make up time, because I have no other work from which I could take girls on pressing occasions.

The Act is strict enough and very fair as it is. When we were placed under it I thought that it would ruin the trade. Things were constantly sent in one evening and wanted the next morning, so that we had sometimes to be at work all night. But as it has turned out the Act has done good by preventing such excesses of work. Most certainly it has done good. I would not change back, if I had the choice. I have lost some work by it but not much. If the law was done away with the old irregularity would return to a certainty. There is no doubt of it. Customers would say to me, "You are not under the Act now." The hands would not like going back to the old plan. It is not likely that they would with so much night work as there was. If indeed very high wages were paid they would work till they drop, but that should not be allowed. The former plan was so unreasonable.

Formerly the hands were here much more time doing nothing. They used to wait till 7 or 8 at night to see if anything would come in. Now I ask people to let me know beforehand if they can, and if nothing comes in by 5, when my townsman comes back from his last round of calls with his van, I let the hands go, and if there is no work ready, not come next morning till 8 or 9, or 10, as nothing is likely to be sent in before then. But on the whole there is more work now but spread over less time, viz.: 14 hours are the outside instead of 24.

The old irregularity could have been remedied in a great degree without any law by more thoughtfulness on the part of the warehouses. But now they are obliged to send their things in better time. Limiting us to 6, however, would not have any further effect of the same kind. If we could have the same amount of work between 6 a.m. and 6 p.m. as we have now between 6 a.m. and 8 p.m. I should much prefer it. But I do not see how this is to be done.

Owing to the sudden way in which work comes in, steam is kept up and the hands on the spot ready to begin at a moment's notice. As soon as a van of goods is heard coming they will get ready, and whatever they are at, sewing, &c., or asleep, are all at work in five minutes. I used to pay them by the day whether working or not, and whether waiting at night or not; it was all the same. Now I pay a fixed sum by the week without reference to how much they work. Wages have risen generally, but on account of the increase in other trades.

210. *Mary Ann Ford.*—I have been here nine years and at other moranding works before, since I was 12 or 13. I like our way of working now much the best. We used often to work all night as well as tho day, even when I was a little girl, but generally get two hours' sleep. Now we scarcely ever work after 7. We don't like working till 8 with the tea half hour; we would sooner give over at 7. I thought that now we were to give over at 6 always. We should like that, but of course could not expect to get the same wages, work or play, as we do now. I should not like to get less than I do.

We lose a good deal of time, but not so much taking the year through as we used. Sometimes we have been a month and not come three mornings at 6, often not till 8.30, 9, or 10.30.

211. *Part of the statement of Mr. R. E. S. Oram* (taken from *supra*, No. 58), relating to warehouses, makers up, and packers in his subdivision :—

With reference to the hours of labour in shipping houses and making up and packing places which are at present under the Bleaching and Dyeing Works Extension Act, 1864, most of the firms in my subdivision have availed themselves of the clause which exempts them from the operation of the Act. The clause is as follows :—

"Provided always, that this Act shall not apply to any building or premises in which all the persons employed are males over the age of 14 years."

With very rare exceptions I believe that in my district the hours of labour in warehouses, &c. have not been excessive during the past year or two, and this is partly owing to the carriers deciding to take no goods after 2 o'clock in the afternoon on Saturdays, nor after half-past 6 o'clock in the evening on other days. I am informed by the railway companies that the carriers' carts leave the warehouses in Manchester not later than 6.30 p.m. every day except Saturday, on which day they leave not later than 2 p.m. The carts are expected to be at the railway stations not later than half an hour after leaving town.

Only men are employed in the packing departments, and the following evidence, obtained from various warehouses and making up and packing houses in Manchester will tend to show that so far as females, young persons, and children are concerned, there can be no insurmountable difficulty in adopting factory hours in the making-up departments of the warehouses in my subdivision, especially if the inspectors and sub-inspectors of factories are empowered to grant permission to work from 7 to 7, as already mentioned.

(1.) Messrs. A. & Co.—We work from 8.30 a.m. to 7.30 p.m. in the making-up department, and have one hour for dinner and half an hour for tea. The early hours have arisen in consequence of the carriers' movement, which has caused a great change in the hours of many warehouses in Manchester. When extra busy, we come at 6 a.m., but never remain after 7.30 p.m.

If the carriers' movement was abolished, and a competition arose amongst the railway companies, the old practices would be revived, and therefore a law should be passed prohibiting young persons from working late hours. Formerly the lurries would remain hours idle; but now the goods are ready in time for the lurries at half-past 6, and is so far an advantage economically to the railway companies. We find the short-hours movement works well, and when we get the goods off the men can go home.

It would be wise to abolish the tea half-hour and stop at 6.30 p.m., for it is absurd to stop for tea when goods are wanted. It is more economical and would facilitate business to abolish the tea half-hour, and be best for merchants and employers. Most of the warehouses have adapted their hours to the carriers' movement, and work from 8 a.m. to 6.30 p.m.

(2.) Messrs. B. & Co.—We generally work from 8.30 a.m. to 6.30 p.m., but remain until 8 o'clock when busy. Since the carriers' movement came on there is not the same immediate pressure as formerly, when we worked until 1 or 2 o'clock in the morning when busy. Formerly one man took the job piecework, and em-

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ployed lads at so much per week, sometimes paying them overtime and in other cases not; therefore it was to the interest of the man to work late. But this system is now abolished in our house, and if busy we get extra men from the club to assist instead of remaining late.

(3.) Mr. C., maker up and packer.—We work from 8 a.m. to 8 p.m. generally, but sometimes until 10 p.m. There is no reason why we should not commence at 6 o'clock in the morning as there are goods ready to go on with. We occasionally come at 6 o'clock in the morning, but then leave at 8 p.m., and have half an hour for breakfast. When we come at 8 a.m. we have one hour for dinner and half an hour for tea.

(4.) Mr. D., maker up and packer.—We work from 8 a.m. to 7 p.m., and when busy we rarely stop beyond 8 o'clock. About three times last year we remained until 10 o'clock. We get extra hands if pushed, as otherwise we could not get off the goods at half-past 6 o'clock because the carriers carts will not stay later. The only reason for working late hours would be inability to get extra hands from the club, which is rarely the case. The principal cause of the earlier hours is the carriers' movement. Where I served my time I have seen goods taken away at 2 and 3 o'clock in the morning, and in fact at every hour during the night. I have seen a lurry draw up at 11 o'clock in the evening, and not get away until 3 o'clock in the morning. We never work now later than 2 o'clock on Saturday afternoon.

(5.) Messrs. E. & F., shipping warehouse.—Our hours are 8 to 6, with one hour for dinner. When busy, 8 to 8 with 1½ hour for meals. Sometimes when busy we work from 6 to 6, with 1½ hour for meals, but have not worked more than 10½ hours above six times the last 12 months. We work until 8 o'clock when busy for the benefit of the next day, so as to send off the goods by the noon train, but never keep the hands after 8 o'clock. We close on Saturdays at 1 o'clock, and when pressed with business get men from the club. The carriers' arrangement has been a very good thing, as I have seen lurries in the yard until 2 or 3 o'clock in the morning waiting for goods. If the carriers came later we should work later. Where I worked formerly we have remained until 12 o'clock in the evening, and sometimes until 2 in the morning, although the lurry had been ordered for 8 o'clock and had to wait all the time.

(6.) Messrs. G. & Co., shipping house.—We work generally from 8 to 6.30, with one hour for dinner. If we work overtime, when busy, no lads remain after 8 o'clock, but we get men from the club at 6*d.* per hour. The carriers regulations have tended to shorten the hours, as the carters will not wait after 6.30 for goods, or would be fined by their club. Some shipping houses will not receive goods after 5 o'clock. Formerly the lurry would be ordered at 8 o'clock, and the man would sleep on the lurry, the hands in the warehouse working away, and the goods not be ready until 2 o'clock in the morning. I have formerly worked from 6 o'clock one morning to 2 o'clock the next morning. If carriers were to receive goods late it would upset everything.

(7.) Messrs. H. & Co., makers-up and packers.—Our ordinary hours are from 8 to 8, but when busy we work until 10 o'clock. No young persons under 16 years of age ever work after 8 o'clock. The merchants obtain interest on their money in the bank, and keep back the goods as long as they can, but if they would let us have the goods earlier we could close earlier. The carriers movement has caused us to have goods earlier, as we have told the merchants that unless they did so we could not possibly get the goods off. We close at 2 o'clock on Saturdays, and allow one hour and a half for meals.

(8.) Messrs. J. & Co., shipping house.—We generally work from 8 to 7. About 25 times last year we worked until 11 o'clock in the evening, and occasionally when much pressed until 12 o'clock in the evening, employing men from the club, and sending the lads home at 8 or 9 o'clock.

(9.) A. B., a lad, aged 15.—I worked for Messrs. ———, whose warehouse is not in your district, until 10 o'clock when busy, and they gave us sometimes 1*d.* or 2*d.* extra, but not always, and if we would not wait, we were dismissed altogether from their employ.

(10.) Messrs. K. & Co., shipping house.—We work from 8 a.m. to 7 p.m., except when busy, but if a pressing order comes we work until 9 o'clock, and sometimes until 11 o'clock. The lads receive 6*d.* extra if they remain until 9 o'clock, and 1*s.* extra if they remain until 11 o'clock. We stop from 1 to 2 for dinner, 5 to 5.30 for tea, and when working late from 8.45 to 9.15 for supper. We worked 18 times until 11 o'clock, and 33 times until 9 o'clock last year.

(11.) C. D., a lad, aged 15.—I worked sometimes until 9 o'clock, and at other times until 11 o'clock in the evening last year, but never commenced work before 8 o'clock in the morning.

(12.) E. F., aged 17.—I worked about 20 times last year until 11 o'clock in the evening, but commenced work at 8 o'clock in the morning.

(13.) Messrs. L. & T., makers-up and packers.—We work from 8 a.m. to 7 p.m. when we are not busy, and stop one hour for dinner, and half an hour for tea. When we are very busy we work from 6 a.m. to 8 or 9 p.m., with an additional half hour for breakfast. The last six months we have worked about 10 weeks overtime.

(14.) Messrs. M. P. & Co., shipping house.—Our ordinary hours are from 8 a.m. to 8 p.m., but when busy we work from 6 a.m. to 6 p.m., so as to get the goods off by the carts in the afternoon. Very rarely we have worked from 6 a.m. to 9 p.m.

(15.) Messrs. N. & Co., warehouse.—Our ordinary hours are from 8.30 a.m. to 7 p.m. We have only worked three times after 8 p.m. in two years, and commenced twice at 6 in the morning.

(16.) Mr. O., warehouse.—We work from 8 a.m. to 8 p.m. generally, but on an average we remain until 9 or 10 o'clock about once a week. We give one hour for dinner, and half an hour for tea, and when working late half an hour for supper, and the lads receive 4*d.* per hour when working overtime.

(17.) Mr. P., shipping house.—Our ordinary hours are from 8 a.m. to 7 p.m., and we close at 1 o'clock on Saturdays. We allow one hour for dinner, and half an hour for tea. When busy we work from 6 a.m. to 8 or 9 p.m., giving an additional half hour for breakfast. We work overtime about half the year, but I only remember one occasion during the last six months that we worked after 9 o'clock in the evening.

(18.) Messrs. Q. R. & Co., warehouse.—Our hours are from 8 a.m. to 7 p.m., with one hour for dinner, and half an hour for tea. When very busy we work from 6 a.m. to 8 p.m., and give an additional half an hour for breakfast. When busy, the work could be finished sooner by employing extra hands from the club, but that would be expensive. We do not work from 6 a.m. to 8 p.m. above six weeks in the year. We only employ men in the packing department.

(19.) Messrs. R. & Co., warehouse.—Our hours are from 8 a.m. to 6 p.m. When very busy we work until 10 o'clock at night, and obtain extra hookers from the club, sending the lads home at 8 o'clock.

(20.) Messrs. S. & Co., shipping house.—We work from 8.30 a.m. to 7 p.m. when not busy, but when trade is brisk the lads, who are all over 14 years of age, come at 6 a.m., but never remain after 7 p.m., although we work until 10 p.m. with hookers from the club.

Notices are posted at one or two warehouses, stating that goods will not be received after 4½ and 5 o'clock, but this rule I am told is not generally adopted.

212. *Mr. Joseph Crook*, late M.P. for Bolton.—As member of Parliament for Bolton I took a leading part in preparing and bringing in the Bill for placing Bleaching Works and Dyeing Works under the regula-

tions of the Factories Acts, which was ultimately passed in the year 1860. Efforts for this purpose had been going on for a number of years, and indeed the question had been in agitation more or less ever since the passing of the Factory Acts.

Owing to certain provisions which were introduced in the Bill as a concession to the masters, modifying to some extent the restrictions imposed by the Factory Acts, the measure is still incomplete, and less benefical than it might and ought to be. I wish very much to see these modifications removed, and the legislation made more effectual by carrying it to the full extent of the Factory Acts. This might be done without occasioning any practical difficulty, and there is no doubt that it would be a great benefit to all concerned.

Even as it stands, however, the law has been a great benefit both to masters and workpeople. It is clear that the masters have not suffered in consequence of the Act, and I hear of no dissatisfaction on their part with it. One of the largest firms, that of Messrs. Ainsworth, who were very strongly opposed to the Bill at the time, are now amongst those who conform the most completely to its spirit, keeping, I believe, almost entirely to the factory limits of hours; yet theirs is a kind of business in which it might have been expected that any difficulties resulting from the Act would have been most felt. They are mainly bleachers of the finest goods, and are noted for a peculiar finish, which makes their work always in great request. It is known that an American order had to wait there three months before it could be completed, and we have had our orders waiting there in like manner for six weeks or a couple of months. Their example shows that regularity of hours is compatible with the most successful mode of carrying on business. Indeed there are several bleaching firms in this neighbourhood who regulate the employment of their workpeople as to time by the provisions of the Factories Acts.

The clause allowing bleachers to make up, within certain limits, time lost from any cause was introduced to meet the difficulties alleged by them to arise from the peculiarities of their trade, and the fluctuations to which it was subject. I was aware that their case did differ to some extent from that of manufacturers, inasmuch as they are employed on other persons' goods and not on their own, as manufacturers are, and consequently are dependent on the time at which such goods are sent to them. It is, however, clear now, especially seeing what has been done under the Act, that these difficulties were much exaggerated, and that the exceptions in the Act, even including those relating to meal times, are quite unnecessary. It is both practicable and very desirable on all accounts that these exceptions should now be removed.

I have practical experience of the working of the Factory Acts as we, *i.e.*, my firm, are cotton spinners and manufacturers, employing upwards of five hundred hands whose employment is regulated by the Factory Act. And though we are not bleachers, yet as we send a considerable portion of the cloth we make to be bleached, I have a practical knowledge of the cotton trade and its requirements, and of the relation of bleachers to manufacturers, or *vice versâ*.

The general features of the bleaching trade remain much the same as they were at the time of the report of the commissioner in 1855, except, of course, so far as the former great irregularity of hours and other evils were remedied by the Bleach Works Act. Also great improvements in machinery and in the arrangements adopted in carrying on the business have been made, and have resulted in greatly economising the time required for producing a given amount of work.

The amount of bleaching done in this country naturally bears about a fixed relation to the amount of the cotton manufacture in this country for the time being. Manufactured goods can of course be exported from this country unbleached, and no doubt a large amount is so. I have no means of judging what the proportion may be, but certainly my impression would be that it is a comparatively small proportion of the whole amount manufactured here. In our case we scarcely ever sell goods grey, and when we do, I believe that they are in all cases bleached before they are exported.

On looking at the returns in the Liverpool Cotton Makers' Association's Weekly Circulars it appears that the cotton trade in this country has now in a great measure returned in extent to what it was before the American war. In the year 1860 this had reached the highest point ever known. In that year the average weekly consumption was 50,590 bales, and the total imports for the year 3,363,994 bales. In the past year (1867) the average weekly consumption has been 49,086 bales and the imports 3,500,771 bales.

It may hence be inferred that the amount of bleaching done in this country is now, or shortly will be, at least equal to what it ever has been, and that just before the American war it was greater than it ever had been before the Act of 1860 was passed.

This, of course, assumes that there was not any increase in the relative proportion of manufactured goods which was exported in the unbleached state. There must have been so, if the bleaching trade of this country as a whole had been unequal to executing the amount of work required of them. But there is no reason, so far as I am aware, to believe that this was the case; and had it been the case, no doubt I should have heard complaints of it in such a centre of the bleaching trade as this is. It seems to follow that by improvements such as I have referred to, or in some other way, the effective working power of the trade has been increased; or if individual bleachers may have been unable to execute as much as they might have done but for the restrictions of the Act, the work has found its way to others who were less fully employed.

It is only in cases in which it is of great importance to have some particular finish that the manufacturer need wait for some particular bleacher to execute his order. It is supposed that a week is sufficient to complete an average order in, though the actual process does not require so much as this. But in the case of an eminent bleacher whom we employ, we know that he is so fully engaged that we cannot depend on getting the goods back as a rule under six weeks or a couple of months. Consequently in ordinary cases, or where time is of more importance to us than the particular finish, we send the goods to other bleachers. Other manufacturers no doubt do the same.

The argument that the bleaching trade is one necessarily more irregular than the manufacturing cannot be made good to such an extent as to justify any exceptional legislation with regard to it. It is true so far as this, that the bleacher is largely dependent for his work on orders from manufacturers. But it is also true that bleachers, whose work is known to be good, are sure to be pretty constantly employed.

This argument also overlooks the fact that manufacturers also are dependent in a great measure on orders and other varying circumstances, such as the price of materials and the state of the markets for their goods. The former irregular hours in factories from these causes are well known.

It is true that a manufacturer can carry on his work whenever he pleases, provided he has sufficient capital. But he cannot always do so to a profit. His success depends on watching the prices and markets, and regulating his production accordingly. There are times when it is not remunerative to him, or, in fact, is a positive loss to carry on his work at all, and if he does so, it is only to avoid a greater loss in other ways, *e. g.*, in order to keep his hands together, or to avoid losing his connexion. Of late, for instance, trade has not been good, but for some cause or other hands are scarce, especially women and children, and if we did not keep ours employed we might not be able to get enough when we wanted them.

In speaking of manufacturers I include spinners, though many are manufacturers only, more probably are both. Many are in effect merchants selling to a great extent on their own account, as well as selling

Bleaching, &c. Works. England. a.

to merchants. Spinners and manufacturers alike buy their materials and sell their goods on their own account, and are never, so far as I am aware, employed as bleachers are on materials which are the property of other persons.

As our works are situated, we do not find any disadvantage from the fact that the limits of hours are wider in bleach works than in factories. That may be the case where bleach works and factories are near together with a less population around them.

I have been given to understand that where the wages are about equal, people prefer factories to bleach works on account of the more regular hours. But probably, also, some girls would prefer bleach works to factories on account of the work being less noisy than in the latter, and cleaner than the work in spinning mills.

I think it very desirable that the meal times of the women and children employed in bleach works and dye works should be fixed as in factories, and that the powers of the inspectors with regard to the keeping the register of time worked, and the production of the register when required should be better defined. At present, certain unscrupulous master bleachers keep women and children at work much longer than is lawful to the great inconvenience of the workpeople, and under existing arrangements there is great difficulty in obtaining legal evidence of such practices.

213. *Messrs. Ferguson Brothers*, bleachers, dyers, and finishers of silesias, satteens, &c., Carlisle. — (Answers to printed form.)

(1.) Seldom exceeded, except by fitters, &c., in repairs. When exceeded at all in other departments, none but males over 18 are kept.

(2.) We cannot say it would make any difference. We have a spinning and weaving mill on the same premises, and practically both works are under the same regulations. We have "Beetling engines" for finishing our goods, and it is a necessity of the process that these work continuously night and day, and there has to be a night and day shift of hands for these, all men, who change every four weeks.

(3.) We have a public school on the premises (British), under Government inspection, and the half-timers attend this, part mornings, and part in the afternoon, changing regularly. School supported entirely by the firm.

214. *Messrs. Oates, Ingham and Co.*, dyers, bleachers, and finishers, Bradford.—(From answers to printed form. Of 550 persons employed, nearly nine-tenths are men, only 34 females, and only 26 of the males under the age of 18, and none of either sex under the age of 13. The hours are not stated, but described as irregular.—J. E. W.)

(1.) The trade of Bradford being subject to fluctuations from changes of patterns in goods manufactured, and other influences produces irregularity in the transactions of the merchants. And as we are in a great measure supported by the merchants, we are subject to these fluctuations, sometimes being filled up with work to such an extent that we are obliged to considerably extend the hours of labour during the day, while at other times our men have to work short time.

(2.) If our time of working was limited to the time prescribed by the Factory Act, it would be incumbent on us to enlarge our works one-third, which would involve the expenditure of a serious amount of money, to enable us to tide over the pushing season.

(3.) If a modification of the Factory Act was introduced to dye works, &c, to limit the hours of labour for adult males to 12 each day, we would try to arrange our business so as to comply with such regulation.

(5.) We are not opposed in principle to legislative action to regulate the hours of labour in all industrial establishments, and are willing to cooperate in a just and liberal spirit with those whose object is to promote the well-being of the working classes by such legislation.

We shall be glad when all such establishments as ours can be brought under the operation of the hour of labour clause, as applied to manufacturing establishments; but do not think it would be wise to adopt this at once, but allow it to be the ultimate to be adopted, and provision would be made in the mean time.

215. *Messrs. S. Smith and Co.*, dyers and finishers, Bradford. — (From answers to printed form. The usual hours of women and youths are "never" exceeded. Of 449 persons employed more than four-fifths are men; only 11 females, one tentering, the rest stitching and marking; and seven half-time boys, all stitching and marking; and 54 male young persons.—J. E. W.)

(2.) Inconvenience," as we should simply dismiss the few half-timers and women we have.

(5.) We have so few women and half-timers that the Acts we are under now hardly affect us at all, and don't suppose that any further legislation would do any good.

216. *Messrs. T. W. George and Co.*, stuff dyers, Kirkstall Road, Leeds.—(From answers to printed form. Of the persons employed, upwards of 100, or five-sixths, are adult males.—J. E. W.)

(1.) We do in busy times, which occupy from four to six months in the year, work over the usual hours allowed by the Factory Act, and consider this excess unavoidable without serious disadvantage to us. This arises from the demands upon us being very irregular, and at the same time very imperative. We receive the goods we dye and finish from the Bradford and Leeds merchants in quantities varying from one week to another in proportion as 1 is to 4, and are always expected to return them finished within the shortest time possible consistent with their being well done. If we fail in this or any other particular to meet the fair requirements of the merchants, we are held responsible for any loss which may consequently accrue.

When orders are cancelled from being too late for shipment arising from any delay on our part, we are charged with the loss which may be sustained. This is occasionally large, especially when the goods are required for a continental fair or a distant country.

(2.) If the restrictions we are subjected to by the Bleaching and Dyeing Works Act were increased, we should be obliged in busy times to decline accepting orders from many of our customers to their, as well as our, serious loss and disappointment, in consequence of our not being able to complete their orders in the usual time. If we attempted to obviate this by an extension of our works, our expenses would be increased by additional wages, cost of repairs, and charge for augmented capital. This would necessitate a higher charge for dyeing to the detriment of our export trade, in nearly the whole of which we are brought into competition with foreign manufacturers. Our workpeople would suffer in a still greater degree, owing to the fluctuating nature of the dyeing trade. They are for several weeks together in receipt of very low wages, and are dependent upon the increased wages they receive in busy times for obtaining a comfortable living.

The work in which our young persons and females are employed is very light, and in no way injurious to health.

(3.) We are content to remain under the modifications afforded by the Bleaching and Dyeing Works Act. To extend in busy times the working hours on Saturday to the drying and tentering departments would be a convenience.

To meet the requirements of the Act we are obliged to close our colour dyehouses at 12 o'clock on Saturdays.

217. *From letter from Mr. J. B. Lakeman*, sub-inspector of factories in the Halifax district.

There are three classes of dyers. 1st, piece dyers of woollen; 2nd, pattern dyers of textures for female clothing, fine goods; 3rd, cotton warp dyers, and for mixture with the worsted in the weaving. Those who do work over time are engaged in precisely the

same trade as those who do not, and the question is, why?

In woollen dyeing a preparatory work is done by young persons and females called "saving," *i.e.*, sewing a strip of lasting along the edge of the piece to preserve it from the dye, and when finished is termed the selvage of the cloth. When the goods are dyed and washed, this lasting is removed by the work called "loosing," performed by boys and girls generally. This preparatory work in both stages of dyeing can always be in advance of the dyes by several hours, so that if it were at all necessary for the men to work till 9 o'clock at night, the other hands might leave at 6 o'clock. This is more evident in pattern dyeing, that is, the dyeing and finishing of female wearing fabrics for the Bradford market. (Quotes authority of a manager of large works on this point.) Now this firm never employ any but men after 6 o'clock. They would not be troubled with the "lost time register. * * *

Bleaching Work — Englar — a.

I know of no peculiarity (*i.e.*, "in those firms of "bleach and dye works who do not avail themselves "of the privilege of the Act for working overtime") except that they are able by regular system to do all between 6 and 6 * * * The cotton warp dyers employ only men.

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218. *Mr. John Adam, jun.* (Messrs. W. Adam and Sons, bleachers, Milnebank, Glasgow), a partner.—We are very much dissatisfied with the difference between the law by which we are regulated and that which applies to print works, and we believe that our trade in general is so. We are limited to 6 p.m., except for making up lost time, while print works are allowed to work till 10 p.m. Finishing printed muslins for printers is part of our business, and till lately was a very important part. Since our Act was passed, however, we have lost a great deal of this, the printers having taken, in a great measure, to doing it themselves instead of sending it to finishers. The difference between our law and theirs tends to increase this practice, as owing to their greater liberty they can accomplish the work in shorter time than we can.

If both the printers and ourselves were put under the strict factory rules it would at least put us on a level with them. Either they must put up more finishing machinery, which they might not think worth while, or they must leave a larger share of the finishing to be done by finishers.

In any case it would be a very great injustice to allow the printers to remain as they are and to leave us on a less favourable footing as we are now, and still more so to tie us up further by taking away the liberty of making up lost time. Whatever may be the best measures to adopt, it is undesirable to have different rules for trades dealing with the same thing. As to health, there is nothing more injurious in our finishing of prints than in the printers. The work is the same. Girls work at the finishing machines in just the same way, and go from us to printers and come from printers to us.

Nearly the whole of our business is in coloured goods, either printed or woven in colours. No other finisher, probably, does fancy coloured work to the same extent as we do. In the last few years there has been an increase of fancy colours. This makes it a greater hardship for us to be obliged to stop at a given early hour. These goods cannot be left to lie wet for the night, so that to stop work at six the washing must stop at five.

The manufacturer of coloured goods must be subject to the difficulties arising from the greater variations in such a trade, but not nearly to the same extent as we are. He can foresee the kinds which will be wanted and arrange beforehand or make to stock. So can a printer. Printers have less occasion to work till 10 than finishers have, as we cannot prepare work beforehand.

We have found the liberty of making up lost time a certain advantage, and should be unwilling to give it up, though practically we only use it to a very small extent. If it were taken away, no doubt some way would be found of getting over the difficulty. If it is continued we want some simpler way of keeping an account of the time. Under the present plan it is impossible to be sure of keeping the law strictly. Owing to the difficulties connected with this, we think that it would be better to allow us to work a rather longer time, say till 8 o'clock, when we require it, without referring to any record of lost time.

We should prefer if only persons under 18 were prevented from working after 6 o'clock rather than lose the privilege of working some reasonable overtime when required, and do not see why women should not be allowed to work as they please. We employ from 300 to 350 hands, two-thirds of them being females. About one-tenth of the males are under 18 and about one-fourth of the females under 18 years of age.

Bleaching Work — Scotla — a.

We hoped that the Act would have the effect of making our work regular, and are rather disappointed that it has not had this effect more fully than it has.

We thought that at first the Act did us a little good by the restriction on labour enabling us to bring up the prices, but any benefit that we derived in this way is all gone, competition having brought the prices down again.

We are not satisfied at being charged for the doctor's attendance, and we believe employers generally consider it a hardship. In our case we are charged 6*l.* 10*s.* per annum, and during the last two years, from 13th June 1866 to 13th June 1868, the doctor has granted in all 30 certificates, or, in other words, we are charged a fee of about 9*s.* for every young person entering our employment, or, if you take it by the number of refusals, it is worse (and that is really the test of his usefulness), during the same time there has been only 16 refusals; that is, we have paid a fee of 16*s.* for every young person the doctor has thought unfit for work. We think it unreasonable that employers of labour should have to bear an additional tax of this kind. If the Government appoint the doctors we think they should pay them.

219. *Samuel Millen,* foreman of a stove.—The workpeople are all very well satisfied with the law as it is, except one thing, viz., the clause for making up time lost from fluctuation of trade. We were glad to get any bill at all at the time even with this clause. But the clause is a great dissatisfaction to the whole of trade, both males and females. They think that if it were done away with, and they were fairly established the same as under the Factory Act, they would be more regularly employed. It might be done perfectly well. It would not do at all to go back in any way. I believe that since I have been here, between two and three years, my girls have not lost three days, to say a week will be safe. Yet we have been getting more in the fancy trade in this time.

Some of the males, I believe, would like sometimes to work longer to make more money, but not the females. The men are lower paid in proportion. Since the Act there have, I think, been fewer married women employed in bleach fields than there used to be.

220. *Edward Gillan,* foreman of another stove.—I have been 20 years here. The work is quite a different thing altogether now from what it was. The women and girls are not over wrought, and they get more. They are stronger and better now. They must be. I feel better myself. We should not be at all willing to have the law altered back as it was; it would cause a disagreeing in the whole trade. The people would think they were going to be ruined. Even for getting more money, they would not like to change. Some of the young ones who do not know

what long hours were, might think that they would like it, but they would soon find out. All the old ones would tell you the same as I do, I am sure of this. If you ask more, you will not get any one to alter the opinion which I give. I am not connected with the bleachers committee.

221. *Mr. Robert Clark* (Messrs. Clark and Co., bleachers and finishers, Southwoodside, Glasgow.)—The difference between the Printworks Act and ours works very unfairly against finishers. Printers can work till 10 o'clock at night and some do so. We can only work on the average till 6. Finishing goods for printers used to be a large part of our business, but of late they have taken more to finishing their own goods. Several of the leading firms about Glasgow do so now; but in addition to this they can, if they please, take in goods from other printers to finish, and I have known this done. It may not be easy to prevent this, but at any rate, as the law stands, it is very unjust to finishers in this way. In making laws all ought to be treated as much as possible on the same footing.

The printers are bleachers and finishers also, and their work in the stoves is just as oppressive as ours. Our stoves are cool compared with many, and range only from 70° to 90°, according to the quality of the cloth. Printers could work only from 6 till 6 quite as easily as we can. In one way they could do it more easily, as many of them print their own cloth, whereas we cannot work till goods are sent to us.

The finishing done for printers was chiefly of light goods, such as muslin. The finishing of cambrics is simpler and could be done by themselves. The print trade was developed very much by the removal of duties, and afterwards by the introduction of cylinder printing. Within the last 20 years or so the quantity of prints requiring to be finished has immensely increased. The year before the American war was the busiest that we ever had in finishing. Then for three or four years we had very little to do, and of late that part of our work has been greatly diminished from the cause which I have referred to.

Besides finishing prints, we bleach and finish coloured woven goods and white goods for merchants and manufacturers. Finishing was a term confined chiefly to printed goods, bleaching having been used to include both processes for other goods. We employ from 250 to 300 persons.

I am very glad that we have got our present law. It did not make much difference to us directly. Our regular hours before it passed were from 6 a.m. till 7 p.m., and we did not like ever to work later if we could help it. Others who did not mind doing so had an advantage over us, and now the law places us all more on one footing.

We lose very little time indeed, and chiefly from holidays. We generally make this up. But we do not want ever to work after 6 o'clock. When we do so it is not for our own sake but only to oblige those for whom we work. We only do it in a case of absolute necessity. I think that from 6 till 6 is quite long enough for any people to work. That is my decided opinion. The people grumble at working after 6, and do not do more than half an hour's work in an hour. Even physically speaking my impression is that you get as much work from 6 a.m. till 6 p.m. as you do from 6 a.m. till 8 p.m. if it is continued for a week or so.

Still the present law works well as we work it, and if I had my choice I would not have it altered. We are very moderate in our use of it; it is true that all may not be equally so. I have no doubt that the workpeople would prefer never working after 6. Any how if the law is altered the printers' hours should not be left longer than ours. I believe that in the end we shall all be brought to the same hours, viz., 6 to 6.

If we were compelled to work only from 6 till 6, no doubt things would accommodate themselves to it. All things fall in to necessity. This limit has certainly been a great benefit to the factories, though they said that they would be ruined by it. But they improved their machinery and their work has been immensely increased by it. If we were put under the same limit we should no doubt seek out improvements in order to accomplish the same amount of work with fewer hands and in the shorter time. This is being accomplished already.

A great improvement has been introduced in stoves; machines are now being used for driving in heated air under the cloth, which by this means is dried in a shorter time without heating the room so much. I have put down one of these machines, and am putting down another, and probably may more. This plan will come into general use. It is a great saving, and dries the goods much more quickly and at least as well.

The wages of the work people have increased, especially of late, and are fully 10 per cent. higher than they were before the Act. This, however, is not in consequence of the Act, but because everything has become so much dearer,—food, rent, &c. The people are not really better off if so well as they were with the lower wages.

We pay wages weekly, which enables the people to lay out their money to much greater advantage than when they are paid fortnightly or even monthly as is the case in some places. With weekly payments they can avoid credit. We consider that weekly payment is a gain of fully five per cent. to them.

222. *Walter M'Miltan*, foreman of a muslin stove (for printed and coloured goods).—If we could change back as we were before the Act I would not on any account. If I had the choice of changing the law so that we could never work after 6, I should decidedly prefer it. But here we only work after 6 for an hour occasionally. We should of course lose what we get paid for overtime, but that would soon right itself. People now keep their goods lying by them for some reason or other before they send them here. They would have to alter that a bit. It would be much better for us to cease always at 6, and still better for the master; that is my opinion. The work would be more regular. The people here do not like working after 6 at any time. They have often asked me whether it could not be done away with altogether. There is always a drag to get them to work later. If I were to go away at 6 leaving any of them to work till 7 under the other men, the girls very likely would not stay after I went.

I feel myself that it is much better for us now than as it was. When I was a boy I had to work sometimes till 12 at night and walk two miles home, and be back at 6 in the morning; I did not consider that I got proper rest so. Of course we can work better with regular hours, though here we have so little overtime to complain of.

I have heard others not in these works speak on the subject. All I believe would say the same as I do, and prefer never to work after 6. If you had the voice of the workpeople at a meeting I am sure you would ascertain that to be the general feeling.

223. *Walter Roger*, foreman of book muslin stove.—The workpeople in bleach works are all glad of the law. It would not do at all to allow any more work than it does now. If that were proposed it would make great discontent. The people would not stand it at all if they could possibly help it. It would be much better to have the hours the same as they are in factories. I have heard this spoken about by others. I never heard of any disagreement about this.

One hour is just about as much as the hands under me ever stay after 6, and that only for an odd day. Generally if any stay all do, but sometimes only part are kept. They do not like to stay. None ever ask to be allowed to stay, but they ask to be allowed to go. People are not so much compelled now as they were before the Act; it is more left to their choice to stay or not. I have been in bleach works 40 years, and have under me generally from 80 to 100 women and girls. Their wages are from 3*s.* 6*d.* to 8*s.* a week; shortly before the Act they were from 2*s.* 6*d.* to 7*s.*

224. *Mr. Fleming* (Messrs. J. J. and B. Fleming,

bleachers, Newlandsfield).—We are satisfied with the Act as it is. We think that we ought to retain the liberty of making up lost time. The excess which occurs is unavoidable when goods are for shipment to foreign markets, and must be finished by a specified date; and besides bleachers should continue to be allowed to work overtime when such time has been lost owing to fluctuations in their trade; also they ought to be allowed to work up time lost in cases of unavoidable accident, or excess or want of water, although the works are not moved by water power. [The preceding sentence is from answers to the printed form.—J. E. W.] We should prefer to have the work quite regular if we could. I do not think that limiting us to 6 o'clock would have the result of making work more even. If it would I should approve of it. Things would no doubt accommodate themselves in the end, but it would take a very long time, and meanwhile we probably should be losers.

We do not wish ever to work beyond 7.30 p.m., with an hour and a half for meals. I think that quite long enough for any woman, and it should not be continuous. It might properly be limited to three days a week. That would do for us. Our overtime is never for more than two days at a time. We never ask the workpeople to make up time on a Saturday. They are against it and we never stand out against what is reasonable.

It is only in three departments in which from the nature of the work we cannot avoid it, that we make up time. [Of the 80 days in a year in which excess of the usual hours is represented as occurring, 32 were for the finishing stove, 26 in the shirt laundry, and 32 in the collar laundry.—J. E. W.] In other parts if work is required after 6 o'clock the place of the women can be taken by the men, and though this is rather more expensive we like to let the women and girls go. Their work in the bleach house is light, and they do it cheaper than men, and their hands being softer are more suitable for the fine work.

I keep the lost time book for the part in which it is most important, viz., the laundry, with my own hand, and see that the others are regularly kept by the manager. It is very important that these books should be correctly kept.

The chief work with which we are hurried is finishing muslin prints. These come at certain seasons, but we have much less of them than formerly, as they are now generally finished in the printworks. The printers have been taking to doing this work for themselves ever since the continuous chain finishing frames came in, some few years back. We think it hard that the printers should be able to carry on this work later than ourselves. Other parts of their work, perhaps, may require to go on late, but the finishing is just the same for both of us. If the printers were limited to the same hours as we are, they would have to send more work to us, unless they put down more finishing machines. As it is we get now only what they are too busy to do at certain times, or only certain fine kinds which they cannot do so well.

We have a branch of business which is new to us, within the last three or four years, viz., washing and finishing shirts and collars, &c. There are other works which do the same. These articles come to us from warehouses in Glasgow, but are made, I believe, in factories in Londonderry. After being washed, &c., they are starched by hand, and then ironed by hand, as in a laundry. This is work which could be done in private houses. Some are in the grey, and have to be bleached.

In this part at times we are in a great push, and at times have nothing. The things are often sent one evening, and wanted the next day. In the laundries and in the muslin finishing we lose much more time than we make up.

225. *Isabel M'Toal*, in one of the laundries.—We only work till 7.30 very seldom. I should like to work till then every night, if I had my health with it. I used to work much longer in printworks. We worked till 10 o'clock there a good deal one or two winters, most nights, I should say. I liked that. I did not get tired. The pay was not much, and we had to work long to make up enough. I went there when I was 13, and stayed some years, and left six years ago. I can make better pay now, and so do not want to work so long as till 10. [Some other women in the same room said that they liked to make the overtime.—J. E. W.]

226. *Martha Reilly*, at a finishing stove.—I am 17, and have worked here four years. I like going away at 6 better than staying till 7.30. I get 2½*d.* extra for staying till then; my weeks wages are 7*s.* 6*d.*

227. *Mr. King* (Messrs. J. Young and Son, bleachers, Pollockshaws), managing partner.—We think that the Act has been a benefit to us as employers as well as a great boon to the workpeople. It is to the interest of both alike that the work should be as regularly spread over the year as may be. Our business is now much more regularly distributed than it was before the Act. During the American war we lost a great deal of time, and used to make up part of it. Since the war ended we have lost very little time indeed, and we have entirely given up making up time. Even when trade was good before the war we used to lose much more time. We were often much pushed, and had to work for nights together till midnight, and then after a push have hardly anything to do. Undoubtedly the present system of working is more profitable to us. Now all cease work at once; then the whole place might have to be kept going late merely for the work of a few, perhaps only 20 or 30 of the workpeople, and this of course made their work more expensive. We encourage the hands to be regular by giving them something extra each week, the women 6*d.* and men 1*s.*, if they lose no time in it by absence.

In consequence of the Act we made some extensions and adopted more machinery with the view of saving increased labour. This of course caused some outlay, but the money was not lost. The return comes in another form by the work being more quickly and economically performed, and the return on expenditure is much quicker. Altogether the improvement in the way of carrying on the business since the Act has been very great.

We think, however, that the Act should be altered in two points.

First, we think that the clause which allows of making up lost time should be repealed. It is open to abuse, and there are doubts as to what can properly be counted as lost time; one person will count as such what another will not. Sometimes too hands must be shifted from one part of the work to another. It may be that the part to which they are moved has time to make up, while that from which they are taken has none. It is difficult to be sure of keeping clearly within the law as to making up time. It is also difficult for an Inspector to check the amount which is worked. The workpeople have no means of knowing. If time is allowed to be made up, they should be able to see that it is made up correctly. When we used to make up time, we used to keep an account of all the hours worked, in accordance with the wage book, which insured the account being correct. The women have no desire to work overtime; formerly when I have had occasion to press them to do so, I have found them very unwilling. They much prefer to leave at 6, and lose what they would get paid for the overtime.

Another point which we feel very much and wish to press, and in which there are others greatly interested like ourselves, is this. While we are limited to 6 o'clock, printworks are allowed to work till 10. Part of our work is finishing printed muslins: we have lost business of this kind from some printers from whom we formerly had large quantities, as they are now taking to doing it more themselves; though when they have more than they can finish even in their extended hours, we still get work from them. No doubt there-

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fore we should have more if their hours were only the same as ours.

The length of hours allowed to printers also works unequally as between printers themselves. There are a large number of job-printers and the smaller houses generally who have not the accommodation for doing their own finishing. This may be in some cases because they do not think it to their interest to combine the two branches, and in others that they have not the means of providing the accommodation. They are thus placed at a disadvantage both as to time and cost as compared with the other printers, and the job-printers are likely to lose their employment when goods are wanted quickly, as the merchants, by whom the job-printers are employed, will supply themselves from printers who can finish. In some cases the job-printer himself employs the finisher, but more commonly it is the merchant. But in either case it is the work of job-printers which forms the chief part of our print finishing, and it is to our interest that they should be able to carry on their business on equal terms with the other printers who finish.

Either the printers' hours ought to be made equal to ours, or ours to theirs; we should prefer the latter to leaving the present inequality as it is, but we should prefer both being brought strictly under the Factory Act hours. We do not in itself wish to have our hours extended to the length of theirs. It would no doubt have the effect of making our business more irregular, which would be an inconvenience and loss.

There is nothing in our work in which we find difficulty from having to stop at a fixed hour. Our business is in light materials, chiefly white and printed muslins; some of the fabrics are coloured from being woven partly of dyed yarn.

We have separate works some miles from here, which depend on water power. As they are nearly at the upper end of the stream, and in dry seasons the water is apt to run short there towards evening, it might often be a convenience to us to begin before 6 a.m. The power under the Factory Act to begin an hour earlier so as to recover any time lost from want of water would give us all the liberty which we should want on this account.

The temperature of our stoves is generally about 100°, or about 15° cooler than they used to be; we have found it better to have them cooler; men are apt to let them get hotter if left to them only.

There are probably not quite so many hands employed in the trade as there were, say, ten years ago, though a greater amount of work done. Wages have risen considerably since the American war, partly in consequence of the Act, and partly because they have risen so much in the factories in the neighbourhood that these have affected ours. Our people used to get less for their twelve hours than they get now for their ten. The price paid for bleaching and finishing is much higher than it was for some years before the American war came on; we were obliged to raise it owing to the rise in wages, coal, and stuffs.

We employ upwards of 300 persons, nearly seven-eighths of whom are females, and nearly all of these adults. I have been engaged in these works one way or other for forty years, and now have the chief practical management of them.

My partners, Mr. Lowndes and Mr. Gilroy, have read the above, and agree with it as the expression of our views.

228. *Messrs. Stevenson, M'Kellar, and Co.*, bleachers and finishers, Hogganfield (answers to printed form).

(1). We consider this excess (*i.e.* to 7.30 p.m.) unavoidable so long at least as the finishing departments of printworks and dyeworks are not regulated by the provisions of the Factory Act.

(2.) Our works are already regulated by the Factory Act, and we may say the only bad effect experienced is that the finishing of printed and dyed goods are leaving the bleaching and finishing works and are being done in finishing departments in connection with printworks and dyeworks, as they can take in hand to accomplish an order in a shorter time, not being regulated (according?) to the provisions of the Factory Act.

(3.) In our opinion the finishing departments of bleaching works should be placed under the Printfield Act, or the finishing departments of printworks and dyeworks should be placed under the Factory Act so as to do justice to all parties interested.

229. *Mr. John Wallace* (Messrs. J. Wallace and Co., bleachers, Mearns.)—In our opinion the Bleach Works Act has been a benefit to the trade, and notwithstanding certain inconveniences which we find from it, we would sooner have the law than be without it, as it prevents excessive work by any competitors.

We have never availed ourselves of the power which the law gives us of working after 6 p.m. to make up lost time. We considered that the manner in which the account of the time was to be kept, and in which time could be made up was such as would make the power of little practical use to us.

We find it very inconvenient sometimes to be prevented from sending off goods as we could do if we were not tied to fixed hours. It is only for the sake of our customers that we wish to send the goods off by the time asked. So far as our interest is concerned, we wish to work as regularly as possible. What we should finish by working later would be taken from the work of following days.

Our business was formerly almost confined to embroidered muslin, but now only a smaller part consists of this. The embroidered muslin trade itself has very much fallen off, and I only know of one smaller house besides ours which is now engaged in this branch of bleaching and finishing.

So far as regards the difficulties arising from a limitation of hours, there is no difference between this and our other business, which is plain and fancy muslin. We have two separate works, and employ about 480 persons, of whom about 370 are females.

There is little occasion to legislate now for the protection of the workpeople. They are much more able to take care of themselves than they were some few years ago. This is owing in a great measure to the scarcity of labour of late years.

230. *Mr. Alexander Gordon*, manager.—It is quite possible that we may take to keeping a lost time book, and making up time occasionally. But I do not think that we should ever make up time for more than a night or so at once, and that on very rare occasions. I believe that if work till 7.30 p.m. was continued, after a short time there would be no more work done than in the regular day; at least, without great effort, and constantly forcing the people to keep up to their work, and to a degree which I should not think right. The work is nearly all hand-work, and it would be more difficult to keep them up to the increased amount than if their work depended on machinery.

We never have any broken time except in the slack season in summer, and then never more than 15 hours in any one week, or, say, 150 hours for the whole period or year.

231. *Messrs. J. Cunningham & Sons*, bleachers and finishers of muslin, West Arthurlie, Barrhead.—(Answers to printed form. Of 350 persons employed, about five-sixths are females.—J. E. W.) For about 40 days per year we have worked at different periods one hour in excess per day, thus making up lost time to the extent of four days in the year.

(1.) We do not consider the excess unavoidable.

(2.) It would not affect us materially in any way.

(3.) So far as we understand the Factory Act, we do not know any modification necessary to adapt it to the bleaching trade.

(5.) We would consider it desirable that all branches of the cotton trade be placed under the Factory Acts. In particular the following divisions of the trade we think should be classed under the same Act, viz., printers, bleachers, dyers, starchers and finishers, lappers and calenderers, shirt dressers, &c. These in operation all dovetail more or less into each other.

Besides, workers, both male and female, are changing daily from the one trade to the other.

232. *William Johnstone* (see No. 245).—I keep the lost time register, and also the time book. I should say that on the average about two or three days, *i.e.*, 20 or 30 hours, is as much as there is to make up in six months, and in part of the work no time. In the bleaching part the book from July 1865, only shows two hours made up one time, which was allowed in order to give some more work before a holiday time, and half an hour on another occasion. [The foreman bleacher stated that they neither lost nor made up time, and that these regular hours were much better. —J. E. W.]

In making up time, our general rule is to make only an hour a day, *i.e.*, till 7. It has been till 7.30, but only in very rare cases. For four weeks together is as much as any department has ever made up time here, I should say. Our employer, I believe, does not care to have any work after 6 p.m., but leaves it to the foremen. The general feeling of the people here is in favour of not making up time. There are some people who are always willing to make what they can. Some girls come two miles.

The business here is very general, and includes goods with fast and fancy or fugitive colours, and either woven in colour or printed.

233. *Angus M'Larty*, foreman of book-muslin stove. —Making up time is in one way a good thing, and in another a bad. If the people had their own choice, they would sooner not do it, but they are willing when it is necessary. The only time that they would be likely to wish it would be at a time like just before the new year, so as to have a little more money then. They would not like any change which allowed more work than the law does now.

I have about 70 women and girls, seldom any under the age of 18 in this stove, and about 60 in a stove above, who are from 13 years old and upwards. The thermometer below is now 96°, and is about the usual warmth.

234. *David Merton*, in a stove.—A few boys and girls work at fanca'ing (swinging the fans for drying), but the same are not at that always. They are changed sometimes to other work. Fanca'ing is hotter and more tiresome. We should have all boys for it if we could get them. The people would rather get home always at 6 o'clock. They do not want to make up time.

235. *Mr. Donald Stewart* (Messrs. A. Hamilton and Sons, bleachers and finishers, Blackland mill), manager.—The Act works very well, and has been a benefit to the workpeople, and not a loss to the employers. But it would, I think, be far better if the making up time clause were out of the Act altogether. Everybody would be equal, and there would be no chance of too much time being made up. The regular time is better for the workpeople, and they work better with it. They get a little more of course when working overtime, but I think they lose as much in other ways.

We never use the power of making up time except for time lost by breakdowns. The employers do not like the people to work overtime except in these cases. They think that working till 6 is long enough for the work people. Breakdowns are not frequent; one may not happen for years, though they may occur with only a short interval. Very little time is lost except by breakdowns and holidays. The time lost by holidays is not counted as time to be made up, though longer than they are required to be. We only make up an hour a day, and usually only for a very few nights at a time, and never on Saturday. Last year time was made up in this way for about six weeks. That is the longest period since 1863, when the book began.

We have plenty of work now to occupy us till 7.30, and have had for some time past, if we liked to work so. But if the work was all cleared off by working overtime there would probably then be part of the time with nothing to do.

The actual time taken by our bleaching and finishing is four or five days, but as there are other goods in process or waiting to be done, we want 10 or 12 days to complete an order. If all bleachworks were alike and limited to 6 o'clock, manufacturers might have to send their goods sooner, or a few more hands employed in bleachworks. If a few more were employed in each place it would make up for the shortening the time. After being finished the goods will keep in stock very well. There is no occasion to delay the finishing on that account. Our principal trade is lappets, or white muslin with figures woven in, and also white muslin with coloured sprigs woven in.

Nearly all the females work in the stoves. These are at the temperature of about 100° and from that down to 90°. It cannot be good for them to work longer than till 6 o'clock for long together. The four and a quarter hours from 9.45 a.m. to 2 p.m., is quite long enough time at once in the heat. Their work is light, and indeed they could not stand heavy work in the stoves.

236. *Messrs. J. and J. Leck*, bleachers and finishers, Carmyle.

(1.) As others work overtime we have to do the same to supply business orders.

(2.) The manufacturers instead of keeping the cloth in their warehouses to the very last, would require to send it more regular and so cause a steadier trade throughout the year.

(3.) From 6 a.m. to 6 p.m., and no overtime.

(5.) We hope soon to have an Act to do away with overtime.

237. *Mr. Matthew Robertson* (Messrs. M. Robertson & Co., bleachers and finishers of muslin, Foxbar). —We do not care ever to work after 6 o'clock to make up lost time; we should never think of it unless we were almost forced to do it to oblige our customers when they insist on having an order completed. Of course working an hour or so extra enables us to do more and get off goods sooner. It is very seldom, however, that we can do this. We only make up time when it has been lost by accidents, and it was my impression that we could not make up what was lost in other ways. We lose very little time except from accidents. We have made up a little lately, but have used up all that we had available to make up. The people do not want to work overtime.

It would be convenient if we were allowed to work till breakfast time, viz. 9 a.m., on the fast days, and also begin an hour earlier on those mornings. It would enable us to avoid goods lying over a whole day with the starch in. This is unavoidable on Saturday, but we clear up everything as far as we can on that day.

We employ about 300 persons, of whom only about 20 are men and youths, the rest women, girls, and small boys. The females and small boys are nearly all in the stoves. Most of the workpeople live in boarding houses belonging to the works, but some come from Paisley, three miles off.

238. *Mr. W. M. Pollock* (the Lounsdale Bleaching Co., near Paisley), managing partner.—The law has worked well with us; we find no difficulty from it except that we should like to be able to employ children at 12 years old as whole timers. It is necessary that people should come to us early; if they come later they do not stay from choice, but only from necessity. They do not like the heated atmosphere unless they get used to it young, but then they think nothing of it. Our heat is only moderate, viz., from 85° to 90°. A great number come to us as soon as they can get passed as 13. We employ from 280 to 300 people, nearly all women and girls. We do plain muslin.

We do not make up lost time except in times of distress, such as the cotton famine. We are generally full of work and do not lose time, and could seldom make up any. The workpeople would not be willing to do it.

We use water power as an auxiliary, but have steam, and do not depend on the water. The only way in which we lose time on account of the water is from the works being flooded.

I think it desirable that the laws affecting different trades should be as much the same as is practicable.

I think that the number of people employed in bleachworks has decreased in the last 10 or 12 years, the cotters from Ireland or Scotland having diminished. But more bleaching is done by the same number of hands.

239. *Mr. Peter Currie* (Messrs. R. Fulton & Sons, Glenfield), manager.—The business here is milling and finishing woollen and mixed goods, such as dresses, flannels for shirts, tweeds, Paisley shawls, &c. We also prepare flannels, shawl cloths, and delaines for printers by scouring and sulphuring them, the processes which in woollen goods answer to bleaching in cotton, and perform the same processes on white woollen yarns. With the exception of this preparing plain goods all our goods are in colours, most of them woven in colours.

The bulk of our work comes in seasons. As regards the goods manufactured in colours, the work must come equally in seasons to the manufacturers'. But they can often prepare for the seasons months beforehand, though often they cannot, owing to the fanciful nature of their trade. It is uncertain what patterns will take, and when orders are got there will be great runs on certain patterns only, and it would not answer to the manufacturers only to have others ready. In this the manufacturer is just the same as the printer. He can only keep goods in stock if they are such as are sure to sell and he has sufficient capital.

In factories of course they can only work the fixed hours. If the goods were sent to us as regularly as they are manufactured we could work in equal hours. But as it is they are sent very irregularly. Perhaps one week we have as much sent as we could do in two, and the next week not half a week's work. Many of the goods too which we do are made in handlooms, and at them people can work as they please, and in fact do work day and night sometimes.

We therefore lose time and make up time. Last year we lost very little, and so had very little to make up; in fact we had made it all up and had none to use. The year before we lost more, but I think made that up too. Sometimes we make up an hour and a half in a day, and continue it for five or six weeks or two months at a time.

It is no gain to the finisher to be pushed and have to make up time, but the reverse. It is more expensive to work overtime, but by doing it we get the work instead of losing it altogether. It happens sometimes that a manufacturer only completes his order just in time. This may happen from several reasons, *e. g.*, from his putting off purchasing the yarn. Whatever may be the cause it pushes the finishers, and this, as I have said, is no gain to us.

If our work was limited to 6 o'clock always it could be managed quite well. It just comes to this: if we have the power of making up time we avail ourselves of it, and must do so or lose the work; if the power were taken away it might lead to our putting up a little more machinery. We have just put up a progressive stentering machine to enable us to get through work more quickly. If we had been able to work without any limit of hours it is probable that this might not have been adopted.

The employment here is of several different kinds. Some girls are employed in "teazling" or raising the surface of the cloth by means of teazles fitted on a machine. When this part works extra time men are put when necessary in the place of the girls.

At the milling and scouring, about half are men, and half women who watch machines. We should have all women, but when we work extra time in this part the women leave at six, and we take men from other parts of the works to fill their place, and it is better to have to fill only half the places than all. Only men work at the steam can drying.

In the stoves all are women and girls with a man or two to superintend. The temperature is about 110°. We are, as already stated, putting up a stentering machine also.

The stitchers are girls who sew pieces together, and also untie bundles of yarn and arrange it. We dye flannel, but only men work at this.

There is also the calendering and making up of the usual kind. Altogether there are about 110 persons regularly employed inside the works, mainly females from 13 upwards, and some boys.

There are several other houses in the woollen line, but I think hardly any that is only in the woollen line like this. I believe too that our house has been more regularly employed than any in this line for the last year and a half.

The woollen trade in this district is on the increase. The flannel trade is new here within the last six or eight years, and before that was confined chiefly to England. The goods which we finish are manufactured chiefly in Glasgow and the neighbouring towns and country district up to 50 miles or so round.

240. *Mr. James Wallace* (Messrs. W. Wallace & Son, bleachworks, Town Mill Road, Glasgow), principal of the firm.—All our business is in fancy goods, some woven in colours, and others printed. They are essentially season goods. We lose very little time however. The time book shows that in the lapping department not more than 50 hours were lost in six months, and these are made up. We generally make up what we have lost. We do not however like making overtime. It is not profitable. We pay for it at the rate of time and a quarter, and therefore never make overtime if we can avoid it, as it costs so much. We only make it for the convenience of the manufacturer. We would far sooner do the goods next morning than after six in the evening. Things are often sent to us at night and wanted back the next morning.

It would however be hard to take away the liberty of making up lost time, and I think that we might be allowed to work till eight at a push without keeping any account of the time lost. I see that some might do this habitually, and do not see how to prevent it. Even the power of making up time ought only to be used occasionally, and not for long periods; and I am not aware of its being used to such an extent. If it were taken away, it would be no hardship to us as regards our profit, but it would be some to our customers. Manufacturers can get their goods ready for the seasons early enough in a general way, and they send them to us generally regularly as they are made; but they are liable to pushes from repeated orders, and cannot avoid being behind then. For ourselves, however, we should have no objection to work only from 6 till 6, if all were placed on an equality. We should like to be allowed to work night relays, but do not care to work the same set later than 6.

The greater part of our work is merely finishing, with a little washing. Woollen goods are sheared or cropped at machines attended by girls. The goods which we finish for printers are chiefly flannel and woollen. I am not aware that any goods of this kind are finished by the printers, though cotton goods are. But the long hours which printers can work, seem to make our customers think that we can work the same. If any change is made, we ought to be made alike, one way or other, though we should never wish to work later than eight anyhow.

241. *Mr. Hugh Cochrane* (Messrs. Pollock & Cochrane, bleachers and dyers, Thrush Craig, near Paisley), one of the firm.—We find the Act work very well. We make up lost time, but cannot make up all that we lose by a long way. For instance in one half year, after counting the time made up, we lost 136 hours, and in one period 390. We never make it up for more than two or three weeks together. We book the time of the longest worker in the whole works as the time of all.

If we were like they are in the factories and could not work after 6 o'clock, and it were the same for us all, it would, I think, be far better and the work more regular. But while others work after 6, we must.

We bleach, dye, and finish cotton goods, coloured and black muslin, and buckram. We employ commonly about 60 women and girls and 20 men and

boys. All the women and girls work in the stoves, except two or three at the starching mangles. I cannot tell the heat of the stoves exactly, they differ. I have seen the thermometer at 150° in one, but that is hotter than usual. They are I should say from 100° up to 150°.

242. *Mr. James Stewart* (Messrs. J. and P. Coates, thread bleachers, Nethercraigs near Paisley), manager.—These works are only for bleaching the thread made by the firm in their cotton doubling factory. Our work therefore goes on quite regularly, and there is never any occasion to make up time. There is nothing so far as the manipulation goes, to hinder the work from being done regularly in the ten hours. The factory is large and employs about 1,600 persons, but only about 32 persons are employed here, but we can bleach 4,000 lbs. of thread daily. The firm have dye-works in like manner for their own thread, employing only a dozen persons or so. For the same reason these have no need to work overtime.

We are therefore in a different position from bleachers who work for other persons, and who are dependent on the time at which work comes to them. If some of these work after 6, others must or be liable to lose work. If all agreed to work only till 6 the work could be done perfectly well. There are plenty of bleachworks, fully in proportion to the factories.

By putting on a very few more hands, say about four girls, we can do 25 per cent. more in a day, without any increase in the hours or the accommodation. The increase of the hands does not go in the same ratio as the increase of the production. The same must be the case in other thread bleachworks though in some extra accommodation might be required.

Our stove has a great advantage over the others which I have seen which are heated by fire. Ours is heated by steam, which can be turned off and the stove cooled down before the workers go in, so that they can be in it with comfort and without injury to health. It was adopted by the employers for this purpose. We have a heat of 150°, and can raise to 180° by shutting the ventilators, and yet when the workers are in it is cool, only from 70° to 80°. Also with heating by steam there is less risk of fire and the rate of insurance lower, and the goods do not get any sulphur from the heat.

There is no doubt whatever that working in hot stoves is bad for the health. I have seen enough myself to satisfy me of this. I have known stoves at 130° or 140°.

243. *Messrs. J. & H. M'Connell*, bleachers of copes and other yarns, Neilston (Answers to printed forms)—

(1.) Owing to change of styles for summer and winter wear we have a good deal of idle time during the summer months, when manufacturers are at their dark goods. But this idle time we manage to make up in December, January and February, never exceeding two hours per day, or from 6 a.m. to 8 p.m.

244. *Messrs. M. Blackwood & Son*, bleachers of thread, yarn, and chains, Barrhead (Answers to printed form)—

(1.) We work to order only, and in the case of shipping orders we sometimes require to work overtime; also in consequence of fluctuations in trade.

(2.) We would require a greater number of workers, which would have the effect of making their wages very irregular.

(3.) The present Act works very well; we have no desire to work more than an hour extra, and that as seldom as possible.

245. *William Johnstone.*—I am secretary of the Bleachworks Operatives' Committee for the west of Scotland, and am employed in the warehouse at Messrs. James Cunningham & Sons. (See supra, No. 232)

The Act has been a great benefit to the workpeople. It has greatly mitigated the regular hours of work, and raised the wages as compared with the time worked.

But there is a general feeling amongst the workpeople against making up lost time. There is also a feeling that owing to this being allowed in some places too much time is made up. This could be prevented better if the inspector could see the time book as well as the Government register. I have charge of both where I am employed, and in the time book every name is entered, and the actual number of hours worked by each person.

When the Bill was brought in, the greatest objection to it was made as regards the boiling house in bleachworks, as being a chemical process which could not be worked within fixed hours. That department at our works is now the most regular of all, and has scarcely made up any time since the Act passed.

It is general in the trade since the Act to employ men at night for work which before was done by women at night.

246. *William Parker.*—I am employed as bleacher at the works of Messrs. William Adam & Sons. (See supra, No. 218).

Personally I would much prefer that for the trade there should be only work from 6 to 6; but I admit that there are times when the making up lost time has been an advantage to the employers and employed. Our business is in coloured goods, and subject to seasons, and there often come brushes.

In the bleaching department we have made up time for a month together; I think not longer. There are men and women, no boys. The women unravel the cloth, draw it up, and examine it. Usually in November, December, and January we are busiest. I think that this winter we have made up more time than ever since the Bill came into operation. The winter before we were very busy, but we worked with a night shift of men, and that freed the women from making up time. Some of the people, not many, come two miles.

247. *Robert Wilkie.*—I am in the finishing department at Messrs. James Young and Co.'s. (See supra, No. 227).

The Act has given great satisfaction to all of us as far as it goes, but the people object to the making up lost time. I do not know of any cases in which time is made up for long periods together; I mean such as longer than a month or so. When time is made up anywhere it is commonly till 7·30. Three quarters of an hour are taken for each of the two meals. This was the custom before the Act. We have girls here who come as much as three miles to our works. I believe that in the trade generally the stoves are not so hot as they were, but are from 90° to 120°.

248. *John Muir.*—I am in the finishing department at Messrs. R. Clark & Co.'s works. (See supra, No. 221.)

At our place for two years past we have not made up time, except one time I made up three hours. Yet there has been a lot of broken time, both from breakdowns of machinery and an overflow of water. We were flooded out two days. There was work to be done if the employer had liked to make overtime.

249. *Robert Stewart*, bleacher in Messrs. A. Hamilton & Sons. (See supra, No. 235.)

At our place we never make up time except when there is a breakdown in machinery. That does not happen above twice in a year, and we only make up time for a week or so.

I believe that our employer would be satisfied to have the Factory Act.

250. *Mr. James Wright*, calenderer, hot presser, and starcher, John Street, Glasgow.—I was chairman of the Glasgow calender masters, and represented their case in London when the Bill for regulating our works was before Parliament. My business is the largest in Glasgow for finishing and making-up only, without bleaching. I employ from 110 to 140 persons according to the state of trade, and have accommodation for fully 200. I have been 30 years in the business, and before that was for several years connected with a spinning and weaving factory.

We think it a great grievance that printers should

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be allowed to work longer hours than we can. Finishers all complain of this, no doubt from regard to their own interests; but they feel the injustice very keenly, and the unfairness of our position in this respect has often been the subject of conversation at meetings of our trade. The practice of printers finishing and also of their making up their own goods has greatly increased of late years and is still growing, and the amount of this work which we get diminishes in proportion. Owing to their greater freedom from restrictions we cannot compete with them on equal terms, though the work itself is in itself precisely the same whether done by us or them. The printers who now send work to finishers are chiefly the job printers and smaller places, though the larger send also when they have more than they can do.

Bleaching, dyeing, printing, finishing, and making up, are all performed on the same kind of materials and are so closely connected that they ought to be regarded really as one trade, and come under one law. But I do not propose that this should be more strict than that under which we now are. If any exceptions are to be made they should be in favour of the finisher and the maker-up. His process comes the last of all, and the delays of the manufacturer, bleacher, dyer, printer, and merchant are all accumulated and culminate to a point in him. Hence we often only know from day to day what we shall have to do, often only from hour to hour. Printers know weeks and months beforehand and can arrange their work accordingly. Certain kinds of work which we do take as much as two days, which is the longest time, that is to say from the time of receiving till the time of returning or packing the goods finished, which is generally from the afternoon of the first day till the forenoon of the third day. But some kinds can be done, if the quantity is not large, in an hour or two, and things are often wanted back in two or three hours, and very commonly goods coming in at night are wanted early next day.

Again, as to the nature of the employment, our work is all very clean and dry, and nearly all like warehouse work, while much of the work in printing, bleaching, and dyeing is slushy and dirty. In the stove which I use the goods are dried by steam-heated air in circulation, and the workers are nearly all outside. This is much more healthy than where the girls work in heated still air.

Owing to the suddenness with which work is wanted we have to keep the hands here all the time and pay them for it, though they are often doing no work. We ought therefore to be allowed to make up any time which is lost. There is no objection to our being required to enter the time lost in the book. I pay for overtime at the rate of time and a third, but would rather do this than disappoint customers, though it is for their benefit, not for my own. Owing to the shortness of the time which each set of work takes, it cannot easily happen that we make up time for long periods continuously, though it might in a brisk season if there were a long succession of orders.

Unless we are allowed to make up time when required great loss may be caused not only to us but to the manufacturers. My business is in fancy goods of all kinds, chiefly for female dress. In a fancy trade the value of goods depends in a great measure not on the material but on the style, which commonly lasts only for a season. If they are not completed by a particular time they may be too late for the season and so lose most of their value. This applies equally to the manufacturer of fancy goods, who in this respect is in a different position from the common manufacturer. A great many of the manufacturers here are manufacturers of fancy goods, and their number has much increased of late. The loss of a season for such goods is very serious.

The cost of my work has been greatly increased by the Act. I used to get through more work with fewer hands and the wages were lower. The increase is very marked in the payment to the boys and girls. Their chief work is stretching and laying on or folding, which children could do very well, and I used to employ them from 10 years old. We used to work till 8 and stop pretty regularly then. Now I have no boys and girls under 13, and have to pay the elder ones very much higher wages, nearly double.

(*Added from answers by Mr. Wright to printed form.*)

(3.) To make the restricted age 12 years in place of 13 years, and to make the working hours to half-past 6 to make up for the half hour lost in meals. The finishing and folding of goods being the lightest and cleanliest part.

(5). I think that now (the register having existed for more than 13 years. J. E. W.) the possession and exhibition by the proprietor of the parish registrar's certificate of age should be sufficient warrant for employing youths, one half paid by employer and one half by employed.

251. *Mr. R. G. Easton*, (Messrs. Crawford and Easton, calenderers and packers, Buchanan Street, Glasgow.)—The Act regulating our works has made very little practical difference to us. We worked hardly any overtime before. We always set ourselves against, it and kept a sufficient staff of hands to do without it, except very occasionally, and to a very small amount. We make up time now in like manner, but very rarely, and very seldom for more than a night at a time. Overtime is not for our interest but for the convenience of our customers who send in goods at the last moment and must have them ready by a certain time, *e.g.*, to send by a certain ship. We pay for overtime as time and a half, *i.e.*, at a rate 50 per cent. higher than for work in the regular day. We are sure therefore to avoid overtime on this ground alone, as well as for its own sake.

Still in such a business as ours it is necessary that a little discretion should be left, and we consider that Government or Parliament interferes too much in such matters; we see however that a discretion, if left too wide so as to allow of working overtime for months together, is open to abuse. All that we want is a little safety valve for an emergency; it would be sufficient for this and prevent any abuse, if we were allowed to work not more than 60 hours in any one week, or than 12 hours in any one day. We however by arrangement with our workpeople in consequence of a strike have limited our week to 57 hours instead of 60, and those whose regular week is 60 hours would require a proportionate margin.

Our house is a fair specimen of other houses in the same business in Glasgow, though possibly our hours are slightly more regular. Our house is one of the oldest established in the business in Glasgow, and with the exception of two or three of those who finish also, of which there are only three or four, is about the largest. We employ altogether from 50 to 60 persons, about half of them girls from 13 years upwards and young women. It is only within the last two years that we have employed any females; before then we had only men and boys. The work of the females is very suitable for them and consists in cutting up, measuring, packing, and folding the goods, and answers to what in Manchester is called making up. The calendering is done by steam power, but employs only men.

252. *Mr. Donald Matheson* (Messrs. Donald Matheson & Co., fancy yarn dyers, Govan Croft).—We are about the largest fancy yarn dyers in or near Glasgow, and employ when in full work from 300 to 400 persons.

The Act did not materially affect our operations. We would almost as soon be under it as not, as it now stands. As a representative of the trade, I took an active part in opposing the Bill as it was first drawn, and in obtaining certain necessary modifications. That relating to the meal hours of male young persons is very important to us, and must not be altered. It is true, that nearly all employed in the dyeing are men. Juvenile or female labour is not suitable for the process. But we must train up some labour, and it is only for the sake of this that we employ any boys at all in the dyeing. I know no respectable fancy dye

works in which female labour is employed with the men in the process of dyeing. We have no women or girls except in the warehouse.

We like to have the liberty of making-up time, and should oppose its being taken from us. But it would not really be a matter of much practical importance to us. It is very seldom that we make up time, and never for more than a night or possibly a few nights at a time. We do not like making up time, and only do it in cases of necessity, *e.g.*, when there has been some accidental delay, or when the yarns are unusually late in reaching the works, and some particular order must be completed. From my experience all overtime is bad economy. The only part in which we, in fact, make up time, is in the warehouse, when the yarn has not been brought to us till late, and the men would be delayed next day if the women and girls did not get the yarn ready for them over night, in packing it and arranging it for their use.

The women and girls who thus occasionally make up lost time by unpacking and preparing yarns in the grey warehouse, are not hard nor continuously wrought. Their work is chiefly in the morning making-up finished yarns for despatch, and in the afternoon arranging the grey yarns to be put in process next day. During part of the day they are not unfrequently almost or entirely idle.

We have been advised by our agent that the warehouse work, being chiefly packing, does not properly come within the Act at all. It is true that part of their work, and that at which alone they make over time, is really unpacking the yarn from the bundles in which it is brought to us.

I feel certain that the other dyers about here do much the same as ourselves about making up time, and do not make it up often or for long periods. The work was never irregular like the bleach works. I account for this by the fact that in dye works the greater part of the work must be done by men, whereas in bleach works it is done mainly by women and young people, and the men's wages being of course higher, and their overtime also paid for at a higher rate than the regular hours, makes overtime for dyers very expensive. Also dyeing must be done as much as possible by daylight.

We dye partly our own yarn, and partly yarns the property of manufacturers sent us for that purpose. Some dyers dye only for manufacturers, *i.e.*, the property of others entrusted to them to be dyed. This makes very little difference as regards regularity of work. The latter, or job-dyers, as they are called, are rather more irregular. We dye all kinds of fancy colours, and the demand is always varying. We meet this by varying in proportion the numbers whom we employ on any given day. We do not discharge the hands, but give them their turns of work, and so keep them together.

253. *Mr. Harvey* (Messrs. Alexander Harvey & Co., fancy yarn dyers, Govan Croft).—We dye fancy yarns. These are chiefly for the use of manufactuers in this country, and are woven by them partly in power loom factories, partly by hand-looms in other places. Ours is a fancy and season trade. We are busy in the early part of the year for the spring season, and in summer for the autumn season.

It would be inconvenient for us to be tied to the same hours as the factories. The boys make up time probably for three or four months in the year in all, through at different times, *e.g.*, sometime for a day or two, sometimes for a week or two together, but not more without some interval. We do not wish to work beyond the usual time, but we cannot help it. Yarns are sent to be dyed at very short notice. Our vans call for them and bring them in up till 5 p.m. Goods coming then are often wanted by the morning of the second day. They could not be dyed in the time, unless they were put in hand to be got ready the evening that they came. For this the boys must be kept. We employ no women or girls. If the yarns were sent a little earlier in the day, it would in most cases do away with our need for working after 6, *i.e.*, except in the cases in which we are very busy for some weeks together. A shipping business is not as a rule liable to such short orders, and can be conducted within fixed hours more easily than ours. We do some work for shipping.

When we are busy the boys lose no time. When we are not busy they generally lose some time in the middle of the day, say between 12 and 5. As they lose time they are not paid for overtime, but a fixed sum every week. The lost time register as it is kept does not show how often they have made up time. Though they are waiting after 6 o'clock, still only 10 hours is entered for the day if the boys have been sent away for two hours during the day.

The Act, as it is, has been but little inconvenience to us, or I believe to the trade, except for the certificates and the trouble of keeping the time books. But forcing us in all cases to stop at 6 o'clock would be very inconvenient. We do not think that it would have the effect of making the supply of work more regular. We should like anything that did that.

254. *Answers of Messrs. Archibald, Orr, Ewing, & Co., with reference to their Turkey red yarn dyeworks as carried on at Milton Works and Dillichip Works.*

On the 30th November 1854, Hugh Seymour Tremenhere, Esq. was appointed commissioner by Her Majesty the Queen to enquire as to the manner in which dyeworks and bleaching works were conducted in the employing of children, young persons and women, and in 1855 Mr. Tremenhere reported "that "the evidence shows that in the Turkey red dyeing "Works in Scotland the females and boys need no "legislative protection from excess of labour," and as there has been no change in the manner in which business has been conducted since then, with the exception of a greater application of machinery, and as there is no ground for complaint as to the overworking of our people, and as the workers themselves are perfectly satisfied with the manner and hours in which they are emyloyed, I deprecate any interference by legislative enactment with the Turkey red dyeing trade.

The Turkey red dyeing business is a peculiar one; it is conducted by two kinds of processes, the one process called the old process, and the other called the new process. The new process is only applicable to goods which are not spread upon the ground, the old process is both applicable to goods and yarn which are exposed to the atmosphere every good day, consequently in the winter season we either stop this process altogether, or do very little by it. It is also peculiar from the fact that the production is almost entirely consumed in foreign markets, where we meet the opposition of all the dyers on the continent; and, as the brilliancy of the colour depends much on the exposure of the material to the atmosphere, any restrictions upon the freedom of action in taking advantage of any time of the day to expose our goods or yarns would be injurious to our business, as they cannot be so exposed during rain.

The application of the Factory Act would, therefore, be most injurious to our business, as it is there provided that all parties should take their meals at the same time, and no person is allowed to be on the premises during the meal hours. It is also provided by the Factories Act that no child, young person, or woman can be employed before 6 o'clock in the morning or after 2 o'clock on Saturdays; whereas the work we have to do on Saturdays in Turkey red dyeworks is exactly the same as on other days, and must be so from the nature of the manufacture, as we enter our goods by weight, and every day they advance a stage in the process, the goods taking four weeks from the time they are grey until they are finished reds. On Saturdays, at present, the most of our workers do get away at 2 o'clock, and the remainder not later than 3 o'clock; but in order to attain this they begin earlier in the morning, take their breakfast when it suits them, and work on until the goods are put through

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that day's process. This arrangement is made by the special request of the workers themselves.

The goods by the new process are liable to take fire by spontaneous combustion. This takes place only when the goods are in oily depôt, where about half a dozen girls are working daily, when it is necessary to have the girls working during the night; but as the heating of goods takes place only during summer weather, and even then not frequently, it is in reality no hardship. With this exception our workers are never employed past 6 o'clock; and, indeed, the bulk of our stove and green girls are generally away an hour or two hours before 6 o'clock.

Our hours of working are nominally from 6 o'clock, a.m., to 6 o'clock, p.m., with 2 hours for meals; but the meals are taken as we have described, at times to suit the department of the work in which the people are working, and a great portion of the workers get their breakfasts and dinners carried to them at the works. I have no hesitation in saying that few manufacturing businesses are more healthy than Turkey red dyeing, arising partly from working amongst goods full of olive oil, and also from the fact that the business is generally carried on in the country, and that all the people must necessarily be a good deal in the open air.

For the reasons above given it will be evident that the Factories Act is quite unsuited to the Turkey red dyeing business, and I am certain that no legislative enactment could improve the condition of the workpeople employed in Turkey red dyeworks. From the schedules filled up by us, you will notice that we employ in our dyeworks 905 people of all ages. (This includes the cloth Turkey red dyeing department of the Leven Bank Works (see *supra*, No. 142), as well as the two yarn dyeing works here named.—J. E. W.)

255. *Mr. William Nairn* (Messrs. Fleming, Watson, & Nairn, Turkey red and fancy yarn dyers, Govan Crofts), managing partner.—What was stated by this firm on the former enquiry holds good now. Our views are just the same. The nature of the Turkey red yarn dyeing process remains the same, and the duration also, viz., 21 working days, or three weeks and a half. The number of our hands, however, has increased by one half and when full is now about 300. Turkey red works generally have been much increased since that time. The reason probably is that the Indian market, to which Turkey red goods are chiefly sent, has increased so much of late years, and we seem to have got ahead of the foreigners there, owing probably to our greater perfection in the art. The chief seat of Turkey red dyeing abroad is Elberfeld in Prussia, where there are numerous works, but most of them on a small scale compared with those in this country. There is also a considerable amount of Turkey red dyeing, chiefly of cloth, in Switzerland, but of a lower and cheaper quality than either that of this country or Elberfeld. I am not aware of Turkey red dyeing being carried on in any other countries, at least to any extent worth notice.

We repeat that we should have no objection to being under the Factory Act with certain modifications which our business requires. I do not see how we could do with a short Saturday, though we should be as glad of a half-holiday as any of our workpeople can be. The shortest to which we can bring that day is from 5 a.m. till about 3.30 or 4 p.m., with three-quarters of an hour for a meal. We are quite willing to be restricted to this. The hands come at 5 a.m. in winter the same as in summer, and have done so for years. It is for their sake to enable them to enjoy some holiday on Saturday afternoon as those in the factories around them do.

Another point which causes a difficulty is the weather. This may delay the putting out of the yarn, or the yarn when out may get wet and so require to be longer in the stoves. When there is a delay from the weather we only put out as much as we can get in in good time. If we cannot put any out by dinner-time, 2 p.m., we do not put any out on that day. As a fact, however, it does not happen, say, three days in a year that the workers do not leave by 6 p.m.

I have heard of the yarn being exposed under glass, but should doubt if it would answer. My reason is that Turkey red dyeing is no new thing, but has been known and carried on largely in this country ever since the beginning of this century, and I know of no instance either here or abroad in which this plan has been tried except the one which I refer to. If it should prove to answer it would be generally adopted. The cost of the roofing would not keep us from it. That would soon be saved several times over in coal alone. For our sakes we should have adopted it long ago. On our present plan we can only produce a very small quantity in winter. At other times our quantity is uniform. We never undertake a greater amount than can be accomplished within the limits of our usual hours, which allow generally a sufficient margin for accidental delays. Overtime might occur either from a deficiency of hands, or want of sufficient accommodation in the whole or in some department of the works. Indeed we have sometimes when busy to make overtime, but only with the men.

We do not allow the stoves to go over 150°. It would injure the yarn. The girls are only in for a few minutes at a time.

We are fancy yarn dyers also on the same premises. Only men and boys, called "roughers," who shake out the dye dust from the yarn, work at that. The boys never stay after 6 o'clock.

Women are also employed in the warehouse in "bundling," or making the yarn into bundles ready for packing; and also in "banding" or unpacking and arranging the yarns for dyeing. This is the same for both the Turkey red dyeing and the fancy dyeing. It is only for the Turkey red dyeing that they ever make any overtime, and they hardly ever do so. We can obviate that by putting on extra hands.

PRINT WORKS ACT AND BLEACHING AND DYEING WORKS ACTS INQUIRY.

2, Victoria Street, Westminster, S.W.

FORM OF INQUIRIES ADDRESSED TO EMPLOYERS.

Employers are requested to fill up this Form, and return it to the address printed on the back. The postage need not be paid. Additional space, if required, for answering any of the subjoined Questions, will be found over the page, or a separate sheet may be used.

Name of Person or Firm carrying on the works _____.
Description of work carried on _____.
Situation of the Works _____, in the County of _____.
Date of filling up this Form _____ day of _____ 1867.

Table A.—Number and Age, &c. of Persons Here employed.

—	Males.					Females.			
	Under 13 Years of Age.	Between 13 and 16.	Between 16 and 18.	Over 18.	Total Males.	Under 13 Years of Age.	Between 13 and 18.	Over 18.	Total Females.
Number of Persons employed - -									
Departments or processes in which they are employed - -									

Table B.—Hours of Work and Meal Times.

Hours of Work.			Meal Times.		
The usual Hours.	Limits when the usual Hours are exceeded.	How often such excess ocurs in a Year.	If Regular, *i.e.*, at stated Hours, and of uniform Length.	If not Regular.	On what Occasions or in what Departments or processes the Meal Times are not Regular.
From a.m. to p.m.	From a.m. to p.m. „ „ „ „ „ „ „ „ „ or, *From p.m. to a.m.	For Days „ Weeks or „ Months (as the case may be).	From a.m. to a.m. „ p.m. to p.m.		

* In cases where allowed, as for Males over the age of 13 years, employed in Print Works.

1. If the usual hours of work are ever exceeded in your Works do you consider this excess unavoidable? If so, for what reasons?
2. How would any legislation, assimilating the laws by which your trade is now regulated to the provisions of the Factory Acts, affect you? State any reasons for your opinion.
3. What, if any, modifications of the Factory Acts would, in your opinion, be necessary as regards your trade in the event of any such legislation taking place?
4. How are the times of the school attendance of the children employed in your Works arranged? (Note.—This Question applies to Print Works only.)
5. Be good enough to make any other observations which you think proper in reference to the present Inquiry.

ON HER MAJESTY'S SERVICE.

Her Majesty's

Secretary of State,

Home Office,

London.

Print Works Act and
Bleaching and Dyeing Works
Acts Inquiry,
2, Victoria Street.

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.

REPORT

ON THE

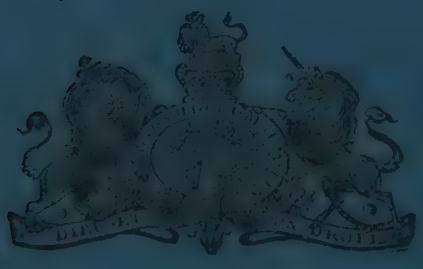
PRINTWORKS ACT

AND ON THE

BLEACHING AND DYEING WORKS ACTS.

WITH APPENDIX.

Presented to both Houses of Parliament by Command of Her Majesty.



LONDON:
PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1869.

ANNUAL REPORT AND ACCOUNT

OF THE

ECCLESIASTICAL COMMISSIONERS FOR IRELAND,

for the Year ended the 1st day of August 1868.

TO HIS EXCELLENCY THE
RIGHT HON. JOHN POYNTZ EARL SPENCER, LORD LIEUTENANT GENERAL
AND GENERAL GOVERNOR OF IRELAND, &c. &c. &c.

WE, the Ecclesiastical Commissioners for Ireland, whose hands and corporate seal are hereunto annexed, beg leave, in pursuance of the provisions of the Act 3 & 4 Will. 4, c. 37, to submit to your Excellency the Report of the proceedings of the Commissioners for the year which ended the 1st of August 1868, and an account of their receipts and disbursements during the same period, distinguishing the specific sources from which all moneys have been derived, and the specific purposes to which they have been applied; also, an account of their receipts and disbursements in relation to Primate Boulter's and Primate Robinson's Funds.

The sum appropriated at the usual annual special meeting of the Board in November 1866, for the several Church works of this year, amounted to 59,001 *l.* 14 *s.* 1 *d.*; of this, 15,054 *l.* 4 *s.* 1 *d.* was set apart towards the completion of 23 Churches undertaken in former years, and 8,050 *l.* towards erecting eight Parish and District Parochial Churches, 887 *l.* 10 *s.* to complete the amounts required for the enlargement of seven Churches already partially provided for, and 4,830 *l.* towards the enlargement of 13 other Churches, and 1,000 *l.* towards the restoration of the Cathedral and Parochial Church of St. Canice, in the Diocese of Ossory, and 2,000 *l.* towards the restoration of the Cathedral and Parochial Church of St. Finbars, in the Diocese of Cork, in aid of very large contributions from the Deans and Chapters, and from private sources, and which have been approved by his Excellency the Lord Lieutenant and Privy Council, and the residue, amounting to 26,990 *l.*, was appropriated to the repairs of Churches, and for fencing Churchyards, including the expenses connected with carrying out these several works.

The eight Parish and District Parochial Churches for the building of which grants were made are,—

Castlerock - - - -	in the Diocese of Derry.
Burt - - - -	
Westport - - - -	in the Diocese of Tuam.
Ballyconree - - - -	
All Saints, N. T. Park - -	in the Diocese of Dublin.
Kilcock - - - -	in the Diocese of Kildare.
Kilkeedy - - - -	in the Diocese of Limerick.
Abington - - - -	in the Diocese of Emly.

The 13 Churches for the enlargement of which grants have been made are—

Termonamongan	in the Diocese of Derry.
Barr	in the Diocese of Clogher.
Antrim, Lambey, Craigs, Drummaul	in the Diocese of Connor.
Magherally, Dromore	in the Diocese of Dromore.
Knockbride	in the Diocese of Kilmore.
Aghade, Barragh	in the Diocese of Leighlin.
Kilnagross	in the Diocese of Ross.
Killorglin	in the Diocese of Ardfert.

In the sum of 8,050 *l.* above mentioned is included 1,460 *l.*, granted in the previous year towards the erection of two Churches, and which are now included in this Report, inasmuch as the grants made in the previous year were afterwards rescinded, the conditions on which same were then made not having been complied with within the period prescribed by the Board; and in the sum of 4,830 *l.* is included 570 *l.*, granted in the previous year towards the enlargement of two of the Churches which are also included in this Report, inasmuch as the grants then made were afterwards rescinded for a like reason.

The Churches of—

Ballyeglish	in the Diocese of Armagh.
Garvery, Muckross	in the Diocese of Clogher.
Culmore	in the Diocese of Derry.
Kilbride	in the Diocese of Connor.
Holmpatrick, St. Bartholomew	in the Diocese of Dublin.
Templebready	in the Diocese of Cork.
Gurrane Kennefeck	in the Diocese of Cloyne.
Kilfergus	in the Diocese of Limerick:

the building of which was provided for in former years, have been completed; and the following are in progress, viz:

Ballyclog, Camlough, Drumglass, Newtown Hamilton	in the Diocese of Armagh.
Grey Abbey, Kilmore	in the Diocese of Down.

Jordanstown

Jordanstown - - - -	in the Diocese of Connor.
Mariners' Belfast - - -	
Rasharkin - - - -	
St. Mary, Belfast - - -	
Castle McAdam - - -	in the Diocese of Dublin.
Rooskee - - - -	in the Diocese of Cork.
Donanaughta - - - -	in the Diocese of Clonfert.
Ardfert - - - - -	in the Diocese of Ardfert.
Killarney - - - -	

Grants to the amount of 286 *l.* have been made towards building, rebuilding, and providing Licensed Houses of Worship in the following Parishes, viz.:

Macreddan - - - -	in the Diocese of Dublin.
Cappagh - - - -	in the Diocese of Limerick.

And a sum of 259 *l.* 7 *s.* 6 *d.* has been granted for the repairs of 25 other licensed Houses of Worship.

The subscriptions from private sources received within the year, in aid of the building, rebuilding, enlarging, and improvement of Churches and Licensed Houses of Worship, have amounted to the sum of 16,140 *l.* 6 *s.*

The Commissioners have, during the year, out of the Perpetuity Purchase Fund, granted loans on mortgage to the amount of 5,943 *l.* 1 *s.* 5 *d.*, for building, improving, and repairing Glebe Houses in the following cases:

Kilmacabea - - - -	in the Diocese of Ross.
Castleblakeney - - - -	in the Diocese of Elphin.
Pomeroy - - - - -	in the Diocese of Armagh.
Tullynakill - - - -	in the Diocese of Down.
Donegal - - - - -	in the Diocese of Raphoe.
Bruff - - - - -	in the Diocese of Limerick.
Magheracloony - - -	in the Diocese of Clogher.
Dunboe - - - - -	in the Diocese of Derry.
Kilmoremoy - - - -	in the Diocese of Killala.
Kilmore - - - - -	in the Diocese of Down.
Shronell - - - - -	in the Diocese of Emly.
Ballingarry - - - -	in the Diocese of Limerick.
Annahilt - - - - -	in the Diocese of Dromore.
Killybegs - - - -	in the Diocese of Raphoe.
Kilpeacon - - - -	in the Diocese of Limerick.
St. Anne - - - - -	in the Diocese of Dublin.
Cong - - - - -	in the Diocese of Tuam.

Kirconriola - - - -	in the Diocese of Connor.
Dunganstown - - - -	in the Diocese of Dublin.
Newcastle - - - -	

And a sum of 17,486 *l.* 9 *s.* 2 *d.* has been paid on foot of these loans, and of those previously granted.

Under the provisions of the 32nd sect. of 23 & 24 Vict., c. 150, the Commissioners have allocated a further sum of 300 *l.*, for the augmentation of small Benefices, which has been distributed among the following Benefices :—

St. Patrick's, Newry - -	in the Diocese of Armagh.
Drumsnatt - - - -	in the Diocese of Clogher.
Newtown Saville - - -	
Malahide - - - -	in the Diocese of Dublin.
St. Jude's - - - -	
Laney - - - - -	in the Diocese of Meath.
Killegar - - - -	in the Diocese of Kilmore.
St. Peter's, Athlone - -	in the Diocese of Elphin.
Culmore - - - -	in the Diocese of Derry.
Kilteevock - - - -	in the Diocese of Raphoe.
St. Paul's, Belfast - - -	in the Diocese of Connor.
Whitehouse - - - -	
Kilbroney - - - -	in the Diocese of Dromore.
Gilford - - - -	
Kinsale - - - - -	in the Diocese of Cork.
Monkstown - - - -	
Abbeystrewry - - -	in the Diocese of Ross.
Tubbercurry - - - -	in the Diocese of Achonry.

By the half-yearly returns of promotions, it appears that appointments have been made within the year to 134 Benefices, consisting of 4 dignities, 13 prebends, and 117 parochial Benefices ; of these 33 appear to be subject to ecclesiastical tax.

With reference to the vacancy which took place in the Prebend of Swords, in the Diocese of Dublin, not having cure of souls within the meaning of the statutes, the Commissioners recommended the appointment to be suspended, and they have been informed that by an Order in Council of the 6th March 1868, the glebe lands of Lissenhall were disappropriated from the Prebend of Swords, and united to the Vicarage of Swords ; and that, by another order of the same date, the appointment to the Prebend was suspended, and the tithe rent-charge disappropriated therefrom, and transferred to the Ecclesiastical Commissioners.

Twenty applications for the purchase of Perpetuities have been received, and the sum realised from this source within the year has amounted to 4,969 *l.* 4 *s.* 11 *d.*; and from instalments in repayment of mortgage loans under 23 & 24 Vict. c. 150, 1,108 *l.* 6 *s.* 7 *d.*

The sum of 18,000 *l.* has been invested temporarily in Government securities pending the execution of works for which contracts were entered into.

The

The annual account of the Trust Fund arising under Bishop Gore's will, from the impropriate tithes of Cahir Parish, in the Diocese of Lismore, has been furnished by the Commissioners to the Bishop of Cashel, Waterford, and Lismore, pursuant to the direction of the Court of Chancery.

All which is submitted to your Excellency's consideration.

(signed) M. G. ARMAGH.
RICHD. C. DUBLIN.
DE VESCI.
SAMUEL MEATH.
J. T. OSSORY AND FERNS.
J. WHITESIDE, C. J.
ARTHUR EDWARD GAYER.
WM. C. QUIN.

SEAL.

(signed) *Robt. F. Franks,*
Secretary.

Board Room,
24, Upper Merrion-street.

(A true copy.)

Robt. F. Franks.
Secretary.

BY THE ECCLESIASTICAL

AN ACCOUNT of all their RECEIPTS and DISBURSEMENTS for One Year, ending the 1st been derived, and showing the Total Amount derived from each Source,

RECEIPTS.	£. s. d.	£. s. d.
Balance in Bank of Ireland, 1st August 1867, General Fund	- - -	10,165 1 7
Ditto - - ditto - - Perpetuity Purchase Fund	- - -	5,363 18 11
Private subscriptions for building, enlarging, and altering Churches, &c.	- - -	16,142 6 -
		31,671 6 6
IN RESPECT OF INCOME.		
From See Estates	56,684 17 -	
– Suspended dignities and Benefices, and disappropriated tithes	22,046 15 11	
– Charge on the See of Derry	6,060 13 9	
– Ditto on the See of Armagh	4,363 11 10	
– Tax on Bishopries and Benefices	18,054 12 4	
– Glebe House Loan Instalments	3,234 5 6	
– Interest on Government Securities standing to the credit of the General Fund (principal for the most part under engagement)	3,391 – 5	
– Ditto - - - ditto - - - standing to the credit of the Perpetuity Purchase Fund	2,325 4 –	
– Ditto on moneys invested in Government Securities for repairs of Trustee Chapels of Ease	25 12 –	
– Ditto on moneys invested for Endowment Fund	125 15 5	
– Ditto - ditto, - - Insurance Fund	529 4 –	
– Ditto on Perpetuity Mortgages	815 – 10	
– Income Tax refunded by Commissioners of Inland Revenue	1,378 17 6	
– Contributions from Economy Funds of Cathedral Churches	25 – –	
– Bequest for keeping Donamon Church in repair	7 5 2	
– Interest on Glebe House Mortgage Loans, under Act 23 & 24 Vict. c. 150	1,190 4 3	
Miscellaneous	468 15 11	
		120,726 15 10
IN RESPECT OF CAPITAL.		
From Sales of Perpetuities	4,969 4 11	
– Ditto 3 per Cent. Stock, General Fund	13,894 15 4	
– Instalments in repayment of advances on loans for Glebe Houses, under Act 23 & 24 Vict. c. 150	1,108 6 7	
– Transfer from Perpetuity Fund to meet advances by loan for Glebe Houses	10,985 7 7	
		30,957 14 5
	£.	183,355 16 9

Dr. PRIMATE BOULTER'S AND PRIMATE ROBINSON'S FUNDS

	£. s. d.
To Balance in Bank of Ireland on 31st July 1867	1,976 – 11
– Amount received from Primate Boulter's and Primate Robinson's Funds	4,927 9 2
£.	6,903 10 1

COMMISSIONERS FOR IRELAND:

day of August 1868; distinguishing the specific Sources from which all Moneys have and the specific Purposes to which the Receipts have been applied.

DISBURSEMENTS.	£. s. d.	£. s. d.	£. s. d.
In respect of Income.			
For Building Churches	27,654 12 6		
– Enlarging ditto	10,541 6 2		
– Repairs of ditto	22,144 18 5		
– Extraordinary repairs of ditto	445 4 9		
		60,786 1 10	
– Requisites for celebration of Divine Service	7,476 10 6		
– Clerks' and Sextons' Salaries	24,331 10 2		
– Organists, Organ Blowers, and for Tuning Organs	1,693 5 –		
– Fuel used in Churches	4,362 14 4		
		37,864 – –	
– Stipends to Dublin Curates, under 3 & 4 Will. 4, c. 37	2,046 19 4		
– Ditto to Vicars Choral and Curates of suspended Benefices, &c.	4,502 16 3		
– Ditto in augmentation of small Benefices	7,418 6 7		
– Ditto to Incumbents of Tullow and Kill Parishes	193 17 8		
– Salaries to Diocesan Schoolmasters	238 5 11		
		14,400 5 9	
– Ministers' Money	– – –	12,908 4 –	
– Endowment Fund, paid Incumbents of Dunlewy, Jonesborough, and Brantry Churches	– – –	131 17 9	
– Superannuation Salaries	– – –	340 13 11	
– Quit and Crown rents	– – –	63 15 5	
– Salaries to Commissioners, Secretary, Treasurer, and Clerks, &c.	– – –	9,459 18 5	
– Rent, Taxes, and other Expenses connected with mensal and other lands	– – –	189 12 9	
– Salary to Solicitor, and Disbursements	– – –	788 10 10	
– Income Tax deducted from Official Salaries £. 228 4 11			
– Ditto paid direct on certain small properties 19 18 9			
	248 3 8	– – –	
– Postage	230 – 11	– – –	
– Advertising for Proposals for Church works, &c.	172 15 6	– – –	
– Stationery and Printing	324 12 –	– – –	
– Survey and Valuation of Lands	148 12 3	– – –	
– Rents, Coals, Candles, Supernumerary Clerks, and other Incidents	1,978 8 2	– – –	
– Registrar's Fees	9 1 –	– – –	
– Proportion of Rent-charge paid to Representatives of former Incumbents	59 15 1	– – –	
– Enrolling Certificates	96 19 6	– – –	
		3,268 8 1	
			140,201 8 9
In respect of Capital.			
By Advances on loan for Glebe Houses, under 23 & 24 Vict. c. 150, s. 30	– – –	17,486 9 2	
– Registering and Enrolling Deeds	– – –	9 3 –	
– Purchase of 3 per Cent. Stock General Fund	– – –	18,000 – –	
			35,495 12 2
– Balance in General Fund	– – –	7,235 16 –	
– Ditto Perpetuity Fund	– – –	422 19 10	
			7,658 15 10
		£.	183,355 16 9

PRIMATE BOULTER'S and PRIMATE ROBINSON'S FUNDS. *Cr.*

	£. s. d.
By Stipends in Augmentation of small Benefices	4,796 16 9
– Balance in Bank of Ireland, 31st July 1868	2,106 13 4
£.	6,903 10 1

(signed) *E. E. Geo. Lefroy,*
Treasurer.

ECCLESIASTICAL COMMISSION
(IRELAND).

ANNUAL REPORT and ACCOUNT of the ECCLESIASTICAL COMMISSIONERS for *Ireland* to the Lord Lieutenant, for the Year ended 1st day of August 1868.

(*Presented pursuant to Act 3 & 4 Will. 4, c. 37.*)

Ordered, by The House of Commons, *to be Printed*,
16 *July* 1869.

328.

Under 1 oz.

ANNUAL REPORT of the COMMISSIONERS of EDUCATION in *Ireland*, for the Year 1868-69.

TO HIS EXCELLENCY JOHN POYNTZ, EARL SPENCER, K.G., LORD LIEUTENANT-GENERAL AND GENERAL-GOVERNOR OF IRELAND, &c. &c. &c.

WE, "the Commissioners of Education in Ireland," constituted and appointed by an Act of Parliament passed in the 53rd year of the reign of His late Majesty King George the Third, and in obedience thereto, respectfully submit to your Excellency a General Report of the Proceedings of the Board since their last Report.

The powers and duties of this Commission, in reference to the various Schools of Royal and Private Foundation, being of a limited and not very clearly defined character and extent, and wholly divested of right or responsibility as to the appointment of Head Masters or Assistants, or of the power of granting any retiring salaries to parties however deserving, necessarily deprives our Annual Reports of much variety, confining them very much to a general statement of the actual condition of the Schools, of the School premises, and of the Estates forming their respective Endowments.

As regards the Royal School of Armagh, we beg to report to your Excellency that it has been formally notified to us, that the present Master has placed the resignation of his office (to take effect in August) in the hands of his Grace the Lord Primate, with whom the right to appoint his successor rests, and that we have every confidence that his Grace will select for that office a gentleman qualified to place this School in that high position of public estimation and utility which its very valuable Endowment and excellent situation appear to demand. We beg to state that the Schoolhouse and Premises, which are fully adapted for a very numerous attendance of pupils, whether boarders or day-boys, are in a very satisfactory state of repair.

In reference to Banagher Royal School, we beg to report to your Excellency that the resignation of the late Master having been, at length, fully carried out, and a new Master having been recently appointed by the Government, we are not in a position to do more than state that the School is now in operation, and that we have undertaken such repairs and works as have been reported to us to be absolutely required for carrying on the School.

Of the Royal Schools of Enniskillen and Dungannon, we beg to report that these very extensive establishments are in a state of complete repair; and that the attendance of pupils at these Schools shows the continuance of public confidence in them. We beg further to state that since our last Report we have repaid to the Master of Dungannon Royal School another instalment of 400 *l.*, on account of the large amount heretofore advanced by him in payment for extensive alterations and improvements of the School premises, the plans and estimates for which had been previously submitted to, and approved of, by this Board; and we expect, before our next Annual Report, to repay the balance still remaining due to him.

The School-house, recently built by us, at the urgent solicitation of the tenants on the Dungannon School Estate has, we are happy to be able to state, been opened since our last Report, and the attendance of the children of the tenants at this Primary School has already so much exceeded the anticipated numbers, that we have determined to enlarge the building, and to appoint an additional teacher.

The number of pupils availing themselves of the Primary Schools opened by us for the tenantry on the Armagh, Raphoe, and Queen's County Estates, shows no material variation from former accounts.

Raphoe Royal School, notwithstanding its somewhat unfavourable position, continues to uphold the character to which we have referred in former Reports. And the Examiner, specially appointed to hold the examination at Christmas for the Annual School Prizes granted by us, made a most favourable report of the answering of the Candidates, and of the management of the School generally.

Of the Cavan and Carisfort Endowments, we do not feel called upon to make any special remarks to your Excellency.

The Royal Scholarships for pensioners and sizars (fellow-commoners not being eligible) in Trinity College, Dublin, have been, we feel, productive of much advantage, especially to those of limited means. And we beg here to submit a list of the present Exhibitioners, and the amounts payable to each, and a copy of our rules in reference to them, specially calling your Excellency's notice to the fact that these valuable distinctions are obtainable solely as the reward of merit after a severe competitive Examination in a very extensive course pointed out, and from time to time varied by us, that they cannot continue to be held unless certain honours and distinctions are annually obtained by the holders, and that thus continuous and successful exertion is secured.

On the Armagh Royal School Foundation:

	£.		£.
E. P. Riddall -	- 50 per annum.	A. L. Wade -	- 10 per annum.
J. Stanley -	- 50 „	J. G. Silcock -	- 25 „
W. W. Orr -	- 35 „	C. Reeves -	- 25 „
W. B. Lindesay	- 35 „	T. Fullarton -	- 10 „

On the Cavan Royal School Foundation:

W. Doherty - - - - - £. 25 per annum.

On

On the Dungannon Royal School Foundation:

	£.		£.
T. H. Crossley -	50 per annum.	E. Bell - - -	35 per annum.
R. C. M'Kell -	30 „	D. F. Kelly -	50 „
S. Woodhouse -	50 „	W. J. Ewing -	30 „
R. Ringwood -	50 „	W. Conry - -	30 „
G. N. Oulton -	50 „	W. B. Smyth -	25 „

On the Enniskillen Royal School Foundation:

	£.		£.
H. Norman - -	50 per annum.	W. Gunning -	40 per annum.
G. Hetherington	45 „	S. Haughton -	30 „
M. H. Little -	50 „	T. E. Hackett -	50 „
T. Gordon -	30 „	J. D. Bourchier	50 „
F. B. Dickson -	50 „	R. M'Minn -	15 „

The Middleton School, which is one of private foundation, continues in a flourishing condition; and the visitors of this School speak in terms of high commendation of the satisfactory condition of the School, and of the establishment generally.

From the Navan and Ballyroan Foundation (Queen's County), we have to state that we have, since our last Report, paid over to the Governors of the King's Hospital (commonly called the Bluecoat School), the annual proportion of the net rents and profits to which that establishment is entitled.

As regards the various other Schools of private foundation, nothing has arisen since our last Report calling for special notice to your Excellency. And we beg to report to your Excellency that the different Schoolhouses and Premises under our care are kept in substantial repair by such outlays as are from time to time stated to be necessary, and that they are now generally in a satisfactory condition.

The unsatisfactory condition of some of the Diocesan Schools, and the law as to them, has been so frequently reported by us, together with the circumstance that the Diocesan School system is now under the consideration of the Legislature, render it unnecessary that we should further refer to this subject.

As to the Estates which constitute the Endowments of the several Schools of public and private foundation, and which are under our control, we beg to state that they are in a generally satisfactory condition, that the rents are fairly paid, and that on all there is a total absence of agrarian crime or outrage. The administration of these Estates necessarily occupies much of our time and attention.

All which we respectfully submit to your Excellency as our Report.

(signed) SAMUEL MEATH. (L.S.)
H. LLOYD, Provost, T. C. D. (L.S.)
LOWRY EDMONDS BERKELEY. (L.S.)
J. G. PORTER. (L.S.)
WILLIAM BROOKE. (L.S.)
J. D. FITZGERALD. (L.S.)
WILLIAM B. KIRKPATRICK, D. D. (L.S.)

Wm. Cotter Kyle, LL.D., M.R.I.A.,
Secretary.

8, Clare-street, Dublin, 5 June 1869.

REGULATIONS of "The Commissioners of Education in Ireland," as to the Royal Scholars.—1869.

"The Commissioners of Education in Ireland" have founded 30 Exhibitions, called "Royal Scholarships," for students who shall enter Trinity College from the Royal Schools of Armagh, Dungannon, Enniskillen, or Cavan, viz., five scholarships of 50*l.* per annum each for Armagh School; and five of 50*l.* per annum, and five of 30*l.* per annum for each of the Schools of Dungannon and Enniskillen; and five of 25*l.* per annum for Cavan School.

The Scholarships can be obtained by such students only as have been at least three years in all, previously to their entrance into Trinity College, pupils in some one or other of the Royal Schools. It is not, however, hereby intended to prevent pupils from moving from one of them to another; but the Scholarships founded for the respective Schools of Armagh, Dungannon, Enniskillen, and Cavan, can be obtained only by students who have entered the University from the schools for which such Scholarships have been founded.

The Scholarships are tenable for five years from the time of their being obtained, subject to certain conditions hereafter mentioned.

The Provost and Senior Fellows have signified their willingness to appoint Examiners in each year, to examine, on the first convenient day after the second entrance, in the month of October, such students as shall have entered from the said four Royal Schools, and shall offer themselves as candidates for these Scholarships.

In 1869 the examination will be in the course prescribed for entrance into T.C.D. (omitting Virgil's Æneid, Xenophon, and Lucian); in the Sixth Book of Herodotus, and in passages taken from such Greek and Latin authors as are not part of the T.C.D. entrance course.

In translating French into English.

In Modern Geography.

In such a knowledge of English literature, and the history of English literature, as may be derived from the First, Second, and Third Books of Milton's "Paradise Lost," Johnson's Lives of Milton, Dryden, Addison, Swift, and Pope, and two of Shakspeare's Plays, viz., "King Lear," and "Measure for Measure."

In History—

Ancient.—Genesis—Exodus, ch. i.-xx. incl.—the historical part of Numbers—the Book of Joshua—I. Sam.—II. Sam.—I. & II. Kings—and Smith's Sacred History, first twenty-four chapters, excluding the appendices.
Grecian.—William Smith's.
Roman.—Liddell's smaller History of Rome.
English.—Student's Hume's History.

In Science—

Euclid—Books I. II. III. VI., excluding all deducibles.
Algebra—to the end of Quadratic Equations, excluding the theory of Equations.
Arithmetic—As in the T.C.D. entrance course.

Note.—The course of examination for Royal Scholarships will be, from time to time, varied by the Commissioners.

The examination will be carried on mainly by means of written papers; and, in addition to the examination by papers in the various authors, each examiner may, at his discretion, examine the candidate *vivâ voce* in one author.

The examination in History and Geography will be *vivâ voce*.

The proficiency of the candidates in Greek, Latin, and English Composition will be particularly inquired into; and also their knowledge of the rules of Greek and Latin versification. Especial attention will be paid to the examination in Ancient and Modern History and Geography.

No fellow-commoner can be admitted as a candidate for a Royal Scholarship.

No pensioner shall be admitted as a candidate for a Royal Scholarship who shall not have remained at one of the Royal Schools to which the Scholarships are attached till an October entrance examination in T.C.D. of the same year as the examination for Royal Scholarships, at which he may be a candidate.

No sizar shall be admitted as a candidate, who shall not have remained at such Royal School till the sizarship entrance examination immediately preceding the examination for Royal Scholarships, at which he may be a candidate.

No student who shall have attained 20 years of age shall be permitted to become a candidate for a Royal Scholarship. The age of the candidate must be proved to the satisfaction of the schoolmaster, and certified by him.

No student shall be elected a Royal Scholar unless he shall have, previously to the examination for Royal Scholarships, produced to the Secretary of the Commissioners a certificate

certificate signed by the Master of the Royal School from which he shall have entered T.C.D., certifying that such candidate is duly qualified according to the above-stated rules.

The candidates from each school shall be examined together, and a return made to the Commissioners of their positive merit; and also an arrangement of the candidates according to their answering, without distinction of schools; the Commissioners reserving to themselves the power of suspending or diminishing one or more Scholarships, if sufficient merit has not been shown.

In cases of equality of merit, in all other respects, the poverty of a candidate will be taken into consideration. A student who has once been a candidate cannot be eligible on a subsequent occasion.

Students when appointed to these Scholarships may retain them for five years from the time of their election, provided that, proceeding regularly with their respective classes, they obtain in each year of their undergraduate course one honour of the first rank, or two honours of the second rank. The election itself to one of these Scholarships being reckoned as equivalent to one honour of the second rank, obtained in the junior freshman year; an University Moderatorship obtained in the senior sophister year, an University Scholarship, in whatever year obtained, the Berkeley Gold Medal, the Lloyd Exhibition, the Wray Prize, success in the first Indian Civil Service (competitive) examination, success at the Woolwich entrance examination, will rank as University honours of the first class; obtaining a respondency; success at any of the subsequent Indian Civil Service examinations will rank as an University honour of the second rank.

A Royal Scholarship shall become forfeited by the holder of it incurring any heavy collegiate censure, such as public admonition, or rustication; or when all the examinations of any year have elapsed without his having obtained in that year one honour of the first rank, or two honours of the second rank, or what is stated in the preceding regulations as equivalent to these honours respectively.

The exhibitions become due half-yearly, viz., on the 1st of May and on the 1st of November. Payments will be made in May to such students only as have obtained in the preceding part of that year at least one honour of the second rank. A half-yearly payment, held over in May, will be made in November, provided an honour has been obtained in the meantime; and payment for the entire year will be made in November to such students as had not qualified for the May half-year's payment, and shall have then fulfilled all the requisites for the entire year.

In cases where very distinguished merit has been shown during their undergraduate course by students holding minor Scholarships, and where Scholarships for the same school remain suspended, or have been forfeited, the Commissioners will, at the close of each year, receive memorials from such distinguished students for an increase of their stipend.

RESOLUTIONS of the Board of Trinity College, Dublin, adopted in compliance with the wishes of "The Commissioners of Education in Ireland."

Resolved,—That the scholars appointed from the Royal Schools by "The Commissioners of Education, in Ireland," be permitted to wear velvet caps, and that their names be in the College books, immediately after the names of the University scholars, without, however, altering their degree of seniority amongst their class-fellows.

MIDLETON SCHOOL.

"The Commissioners of Education in Ireland" will grant annually two prizes, one of 30 *l.* and one of 20 *l.*, to such junior freshmen as shall, subject to the rules prescribed for the Royal Schools, have entered Trinity College, Dublin, from Midleton School; and having been examined along with and in the same course as the candidates for the Royal Scholarships, shall be recommended by the examiner as deserving candidates.

(signed) *William Cotter Kyle*, LL.D.,
Secretary to "The Commissioners of Education in Ireland."

8, Clare-street, 19 December 1868.

EDUCATION (IRELAND).

ANNUAL REPORT of the COMMISSIONERS of EDUCATION in *Ireland*, for the Year 1868-69.

(Presented pursuant to Act of Parliament.)

Ordered, by The House of Commons, *to be Printed,*
15 *July* 1869.

326.

Under 1 oz.

FIRST REPORT

OF

THE ROYAL COMMISSION

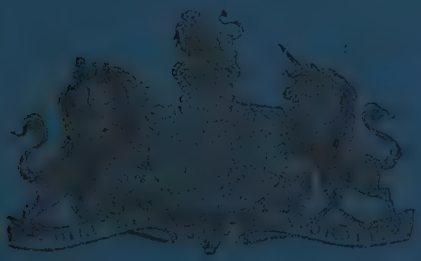
APPOINTED TO INQUIRE INTO THE

PRESENT STATE OF MILITARY EDUCATION

AND INTO THE

TRAINING OF CANDIDATES FOR COMMISSIONS IN THE ARMY.

Presented to both Houses of Parliament by Command of Her Majesty.



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PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1868.

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COMMISSION.

VICTORIA R.

Victoria, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith.

To Our right trusty and well-beloved Cousin and Councillor George Frederick Samuel Earl de Grey and Ripon;

Our trusty and well-beloved Lieutenant-Colonel Eustace Brownlow Henry Gascoigne Cecil, commonly called Lord Eustace Cecil;

Our right trusty and well-beloved Councillor William Lennox Lascelles Lord de Ros, Lieutenant-General in Our Army;

Our right trusty and well-beloved Thomas George Lord Northbrook;

Our trusty and well-beloved Sir Charles Russell, Baronet, Lieutenant-Colonel in Our Army;

Our trusty and well-beloved Sir Duncan Alexander Cameron, Knight Commander of the most honourable Order of the Bath, Lieutenant-General in Our Army;

Our trusty and well-beloved Henry Montagu Butler, Clerk, Doctor of Divinity;

Our trusty and well-beloved William Charles Lake, Clerk, Master of Arts;

Our trusty and well-beloved John Henry Lefroy, Esquire, Brigadier-General in Our Army;

Our trusty and well-beloved Edmund Haythorne, Esquire, Colonel in Our Army;

Our trusty and well-beloved Charles Cornwallis Chesney, Esquire, Lieutenant-Colonel in Our Army, Greeting.

Whereas an humble address has been presented to Us by the Knights, Citizens, and Burgesses, and Commissioners of Shires and Burghs in Parliament assembled, praying that We would be pleased to issue a Commission to inquire into the present state of military education in Our Dominions, and more especially into the training of candidates for commissions in the army, and into the constitution, system of education, and discipline of the Royal Military Academy at Woolwich, and of the Royal Military College at Sandhurst, as well as into the rules and regulations under which candidates are admitted into those Colleges.

Now know ye, that We, reposing great trust and confidence in your zeal, ability, and discretion, have authorized and appointed, and by these Presents do authorize and appoint, you, the said George Frederick Samuel Earl de Grey and Ripon, Eustace Brownlow Henry Gascoigne Cecil, commonly called Lord Eustace Cecil, William Lennox Lascelles Lord de Ros, Thomas George Lord Northbrook, Sir Charles Russell, Sir Duncan Alexander Cameron, Henry Montagu Butler, William Charles Lake, John Henry Lefroy, Edmund Haythorne, Charles Cornwallis Chesney, or any three or more of you, to be Our Commissioners for making the inquiry aforesaid. And for the better effecting the purposes of this Our Commission, We do by these Presents give and grant to you, or to any three or more of you, full power and authority to call before you such persons as you may deem necessary, and to obtain information from them upon the subject of your inquiry, and of every matter connected

therewith, and also to call for, have access to, and examine all such official books, documents, papers, and records as may appear to you, or to any three or more of you, likely to be of use in affording you the fullest information.

And We do hereby require and command you, or any three or more of you, to report to Us, under your hands and seals, with all convenient speed, your opinion on the premises, and any recommendations you may have to make as to alterations in the system of military education, and in the constitution, discipline, procedure, and regulation of Our Royal Military Academy, and of Our Royal Military College.

And We Will and Command, and by these Presents, Ordain, that this Our Commission shall continue in full force and virtue, and that you, Our said Commissioners, or any three or more of you, may from time to time proceed in the execution thereof, although the same be not continued from time to time by adjournment.

And for your assistance in the due execution of this Our Commission, We have made choice of Our trusty and well-beloved John Wallace Hozier, Esquire, Lieutenant in Our Army, to be Secretary to this Our Commission, and to attend you, whose services and assistance, as well as the services and assistance of such clerks and other persons as may appear to you to be necessary, We require you to use from time to time, as occasion shall require.

Given at Our Court at St. James's, this 23d day of June 1868, in the Thirty-second Year of Our Reign.

By Her Majesty's Command.

(Signed) J. S. PAKINGTON.

NOTIFICATION PUBLISHED IN THE LONDON GAZETTE OF FRIDAY, FEBRUARY 26TH, 1869.

War Office, February 23, 1869.

The Queen has been pleased to appoint the Right Honourable Frederick Temple Lord Dufferin and Clandeboye, K.P., K.C.B., to be one of Her Majesty's Commissioners to inquire into and report upon the present state of Military Education, and more especially the training of candidates for the Army, and the constitution, system of education, and discipline of the Royal Military Academy at Woolwich, and of the Royal Military College at Sandhurst, as well as the rules and regulations under which candidates are admitted into those colleges, in the room of the Right Honourable George Frederick Samuel Earl de Grey and Ripon.

The Queen has also been pleased to appoint Major-General Frederick Marow Eardley Wilmot, Royal Artillery, to be a member of the said Commission in the room of Major-General John Henry Lefroy, Royal Artillery, and Charles Stuart Parker, Esq., to be a member of the said Commission.

INSTRUCTIONS.

To inquire generally into the present state of Military Education, and to report specially their opinion upon the following points:

1. The limits of age within which candidates for the several combatant branches of the Military service should be commissioned by Her Majesty.
2. The qualifications which the candidates for each of those branches should severally possess in intellectual capacity and general knowledge to entitle them to admission to Her Majesty's service.
3. The method of examination, or otherwise, by which these qualifications may be tested and ascertained by examiners specially appointed, or by diploma or certificate from the Universities or Public Schools.
4. How far the existing establishments of the Royal Military College at Sandhurst and the Royal Military Academy at Woolwich are adapted for the promotion of Military Education, and whether any alteration or amendment should be made in their present constitution and discipline.
5. At what ages and under what conditions candidates for the several combatant branches of the service should be admitted thereto.
6. Whether in the prescribed course for admitted students general knowledge should be combined with instruction in special professional subjects, or whether such special subjects only should be taught therein.
7. What the course of instruction should be for candidates for the several branches of the service, and whether any and what alteration should be made in the several courses at present adopted in these establishments.
8. Whether these establishments should continue as at present existing and originally designed, viz., as *separate* and unassociated, with different conditions of admission; or whether they should form one establishment only, open to all candidates upon one standard of qualification; or whether these two principles might not be so combined as to admit of a certain proportion of students from one being annually admitted to the other.
9. The method in which encouragement could be given in Public or Private Schools to education in general or special subjects adapted for candidates to be admitted into the Military service of the Crown.
10. The expediency or otherwise of providing that all candidates for commissions as combatant officers in the army (other than men promoted from the ranks) shall pass through a special course of study at Woolwich or Sandhurst, according to the branch of the service in which they are to be commissioned.
11. Whether the course of instruction in the Staff College at Sandhurst for officers, the advanced School at Woolwich for the Artillery, and the Establishment at Chatham for the Royal Engineers, is adequate to fulfil the purposes for which those institutions have been respectively formed.
12. How far improvements may be effected in the present system of preparing candidates for Military examinations; and further to consider and report upon such other points as may appear to them in the course of their inquiry likely to be conducive to the improvement of Military Education.

FIRST REPORT.

EDUCATION OF OFFICERS.

TO THE QUEEN'S MOST EXCELLENT MAJESTY.

MAY IT PLEASE YOUR MAJESTY,

IN obedience to Your Majesty's commands we have "inquired generally into the present state of Military Education," and we now beg to submit to Your Majesty a preliminary Report on the several points specially noted for consideration in our instructions.

Proceedi of the C mission.

During the course of our investigations we have examined sixty-eight witnesses, amongst whom were included His Royal Highness the Field Marshal Commanding-in-Chief, fifteen General Officers, four members of the Council of Military Education, four Commanding Officers of regiments or battalions, the heads of the different Military Educational Establishments, and numerous officers and professors connected with them, as well as several regimental officers of various ranks. Of the latter, six were young officers who had recently entered the service from the Royal Military Academy and the Royal Military College. We have also been favoured with the opinions of many witnesses, who, though not members of the military profession, were from various circumstances in a position to furnish us with valuable evidence, including the Secretary of the Civil Service Commission, four gentlemen connected with great Public Schools, and three public Examiners. In addition to the oral evidence received, we have obtained from numerous officers written answers to questions which we addressed to them on the subjects of our inquiry. We have personally inspected all the establishments in this country devoted to the education of officers; and through the medium of very able reports, drawn up at our instance by our Secretary in respect to France and Prussia, and by Colonel Macdougall in respect to the United States, we have acquainted ourselves with the systems of military education adopted by those countries. We have also been favoured with several interesting memoranda on the Austrian educational system by Colonel Crealock, late Military Attaché at Vienna.

Present Council Military Educati

Evidence, 140.

At present the professional education of officers of the British Army, both before and after they have joined the service, is under the control of a Council of Military Education. This body was instituted in 1857. It is composed of five members, of whom one is a civilian. They are appointed on the recommendation of the Commander-in-Chief with the concurrence of the Secretary of State for War, the Commander-in-Chief himself being *ex officio* president. The Council advises the Commander-in-Chief on all subjects connected with military education. It supervises the various State establishments of military instruction; it appoints examiners, and regulates the educational conditions under which Direct Commissions are distributed.

Military educatio establisl ments.

The present organization under the direction of Government for the general administration of instruction in military subjects comprises the following institutions:

The Royal Military Academy at Woolwich.
The Royal Military College at Sandhurst.
The Royal Engineer Establishment at Chatham.
The Department of Artillery Studies at Woolwich.
The Advanced Class of Artillery Officers.
The School of Gunnery at Shoeburyness.
The Repository at Woolwich, a branch of the School of Gunnery.
The Staff College at Sandhurst.
The Survey Class at Aldershot.
The School of Musketry at Hythe.*

Of these institutions the Engineer Establishment, the School of Gunnery, the

* The present inquiry has not extended to the School of Musketry, as that institution is one intimately connected with the training of the rank and file of the army.

Repository, and the School of Musketry, are not under the direction of the Council of Military Education. The three former are of a purely regimental character, and are conducted by regimental officers.

As subsidiary to these establishments there may be reckoned the Examination Systems which have been introduced for the purpose of ascertaining the general educational fitness of all officers who obtain a Direct Commission, as well as the professional competence of those who are promoted to the ranks of lieutenant and captain.

Of the institutions above enumerated the Royal Military Academy at Woolwich and the Royal Military College at Sandhurst are the only establishments under Government which exist for the purpose of giving a special education to young men before they enter the army.

oyal
ilitary
cademy,
oolwich.

The Royal Military Academy at Woolwich is devoted solely to the instruction and training of candidates for the Artillery and Engineers, and a course of instruction at the Academy is a necessary qualification for admission to these corps.

umber of
dets.
1166.

The number of cadets under instruction at the Royal Military Academy averages about 200. Admission is obtained by open competition, but the candidate must be between 16 and 19 years of age.

xamination
r admis-
on.
1164.

The subjects of the examination for admission embrace mathematics, classics, English language and composition, English history, modern geography, French, German, Hindustani, experimental sciences, natural sciences, and drawing. In the marks assigned to the various subjects a considerable preponderance is given to mathematics and classics, especially to the former.

A candidate can only compete in five subjects, of which mathematics must be one. The others may be chosen by himself. In order to qualify, however, every candidate must attain a certain standard of proficiency in the lower branches of mathematics (arithmetic, algebra, Euclid, and plane trigonometry), in geometrical drawing, and in either French, German, or Hindustani.

ourse of
struction.
4 to 1269, 6668
6671.

The cadets remain two years and a half under instruction, during which period the course of study is almost entirely of a professional character. Examinations are held half-yearly, which determine the promotion of the cadets from class to class. At the end of the course the first class undergo a final competitive examination, which regulates the order in which they receive their commissions. A certain number of those who stand highest on the list are allowed to enter the Engineers, if they prefer doing so, the remainder receiving commissions in the Artillery.

iscipline.
6672, 6699.

The discipline of the Academy is entrusted to a Lieutenant-governor, assisted, except during the hours of study, by a staff of military officers, who conduct the drills and exercises, but have nothing to do with the rest of the instruction. This is conveyed by a body of professors and masters, who are composed partly of military officers and partly of civilians.

oyal Mili-
ry College,
andhurst.
423 to 425.

The Royal Military College at Sandhurst is maintained for the purpose of educating a limited number of young men about to enter the Cavalry, Guards and Line; to the most distinguished amongst whom commissions without purchase, to the number of about eighty, are annually granted.

Iode of ad-
ission.

The limit of age for admission to the College, except in the special case of students of the Universities, is from 16 to 19. All candidates are nominated by the Commander-in-Chief and then admitted to a competitive examination held half-yearly, with the

ueen's and
ndian
adets.

exception of 20 young men, known as the Queen's cadets, the sons of officers of the Army, Navy, or Marines, who have died on service and have left their families in reduced circumstances, to whom direct admissions are given by the Secretary of State for War, and of a similar number of Indian cadets, the sons of persons who have served in India

t 23 & 24 Vict.
100.

in the military or civil services of Her Majesty or of the East India Company, who are nominated, without any restriction, by the Secretary of State for India. From these two last classes of candidates only a qualifying examination is required.

510.
Examination
or admis-
ion.
426 to 430.

The examination is of the same general character as for admission to Woolwich, but the actual subjects and the allotment of marks are somewhat different. Mathematics and classics are placed on the same footing, and the number assigned to each is treble that allotted to any other subject. There are in all nine subjects of examination, but a candidate can only take up five. In two of the subjects, viz., in mathematics (arithmetic, algebra, up to simple equations, and the first three books of Euclid), and in the English language and composition, a fixed minimum qualification is obligatory on every candidate. Of the remaining subjects any three may be chosen. As it generally happens that there

are vacancies enough in the College for all the candidates who qualify, there is practically no competition for admission. 507.

The course of study at the College lasts, under ordinary circumstances, for 18 months. Course o instructio

The subjects taught are mostly of a professional nature, comprising mathematics, fortification, military sketching, military history, French, German, chemistry, geology, and landscape drawing. 521.

At the conclusion of the course the cadets pass through a competitive examination. A certain number of commissions without purchase are awarded to those who stand highest in order of merit: the remainder, provided they obtain the necessary minimum number of marks, are qualified for commissions by purchase, and have prior claims for such commissions over all candidates who have not passed through the College. The Queen's and Indian cadets obtain commissions without purchase on merely passing the qualifying examination. 523. 525 to 528

The constitution of Sandhurst is, in its general features, similar to that of Woolwich; the duties of enforcing discipline out of study hours and of imparting instruction are in separate hands, the former functions being confined almost entirely to the military staff of the College, who form a body quite distinct from the professors and instructors. Organiza tion. 840 to 84

Both at Sandhurst and Woolwich an essentially military character is given to the educational system. The cadets wear uniform; drill, gymnastic exercises, and riding form an important portion of their training; they are subjected to a form of military discipline; and the punishments inflicted are of a military character. Disciplin &c.

The payments required from cadets at Sandhurst and at Woolwich are also regulated on the same principle of a graduated scale. The charge for the sons of private gentlemen is, however, less at Sandhurst, being only 100*l.* a year, as against 125*l.* a year at Woolwich. Queen's and Indian cadets at Sandhurst not only receive a free education, but are provided with uniform and certain fixed allowances at the public expense. Educatio charges. 3636.

The only other educational organization affecting the young officer before he joins the service consists of a System of Examinations for Direct Commissions by purchase. At stated intervals examinations are held at Chelsea, under the superintendence of the Council of Military Education, which candidates nominated to a commission by purchase are required to pass. Examina tions for Direct C missions

The limits of age are as follows :—

From 17 to 20 for the Infantry.
„ 17 to 22 „ Cavalry.
„ 17 to 26 „ Colonial Corps.

The subjects of examination, the allotment of marks, and the conditions required for qualification, are almost identical with those adopted at the examination for admission to Sandhurst. The successful candidates are arranged in order of merit, and, as a general rule, are commissioned according to the place they occupy in the examination lists. 141.

Students of the Universities who have passed the examinations necessary for a degree become *ipso facto* qualified for commissions by purchase; and in their case the limits of age are extended to 23 years for the infantry, to 25 for the cavalry, and to 28 for the colonial corps.

The professional instruction which officers receive after they have joined their respective regiments varies greatly both in nature and amount, according to the branch of the service with which they have become incorporated. Instructi of officer after join

Officers of the Engineers, after obtaining their commissions from the Royal Military Academy, undergo a two years' course of practical instruction at the Royal Engineer Establishment at Chatham before being actively employed. This course, in addition to drill, military duty, and the procedure of courts-martial, comprises surveying, the construction of buildings, field works and bridges, telegraphy and electricity, signalling, reconnaissance, practical astronomy, and other technical subjects bearing upon the special duties of Engineer officers. The instruction is entirely conducted by a staff of officers of the Royal Engineers, and appears to be of a thoroughly practical character. Officers o the Engi neers. Royal En neer Esta blishmen Chatham 6517 to 65

A rather less systematic initiation into the practical subjects connected with his profession awaits the young Artillery officer. Artillery officers.

On passing out of the Royal Military Academy, he is at once attached to a class at the Repository for some months, and instructed in handling ordnance, in mounting, Reposito at Woolw

7828 to 7842.

9302.

School of Gunnery, Shoeburyness.

Col. Elwyn, replies.

dismounting, embarking, and disembarking guns of the largest calibre, in laying pontoons, in making bridges, &c. Simultaneously with his practical instruction in these branches, he is admitted to the Department of Artillery Studies, where he attends lectures on military law, courts-martial, and interior economy. Having completed these courses he is transferred to his brigade; but at a subsequent period of his career he has an opportunity of still further improving his professional knowledge by a year's residence at Shoeburyness, to which place an officer from each brigade is sent annually, for the purpose of acquiring a thorough acquaintance with the latest improvements connected with the science of artillery. At the close of this course he is subjected to a strict examination both as to his own attainments and as to his power of communicating what he has learnt to officers or soldiers under his command. After an interval of ordinary regimental duty he again returns to the School of Gunnery with his battery, either for annual practice or for a short course of instruction. All batteries before leaving England for a foreign station pass some months under instruction at Shoeburyness.

Advanced Class of Artillery Officers.

1628 to 1637; Lt.-Col. Young, replies.

Finally, those who desire to embark in a still severer course of scientific application can, after six years' service, compete for admission to the Advanced Class of Artillery Officers at Woolwich, established in 1864, where during a period of two years they receive instruction in advanced mathematics, and in the mechanical and physical sciences as applied to the material of war. They also go through a course of practical instruction in the manufacturing departments of the Arsenal at Woolwich; and, in company with their lecturers, visit the mining districts and various private engineering and manufacturing establishments. At the end of each year the qualifications of the students are tested by a competitive examination in the subjects in which instruction has been given. On the completion of the whole course the officers are placed in order of merit, which is determined by the total number of marks gained in the two examinations. A minimum standard must be reached by every officer as a necessary condition of qualification.

The instruction is superintended by the Director of Artillery Studies at Woolwich, subject to the control of the Council of Military Education. Two classes have now passed through the course, and a third is at present under instruction.

Officers of Cavalry, Guards, and Line.

To officers who have entered the Cavalry, the Guards, or the Line, no general facilities are afforded by Government for acquiring instruction in any of those professional subjects which lie beyond the routine of regimental duty.

Examinations for promotion.

Two examinations, however, confront them in the earlier stages of their career,—one within a year after they have entered the service—and another preliminary to their promotion to the rank of captain. The subjects of these examinations are set forth in Your Majesty's Regulations for the Army, viz., drill, the interior economy of a regiment, military law, and the special duties of that branch of the service to which the officer belongs. At the second examination lieutenants are required, not only to prove their competence as regimental officers and their knowledge of military law, but to show that they possess an acquaintance with field fortification and reconnaissance: yet although these latter qualifications are very distinctly demanded by the Regulations, it does not appear that a real attempt is made to exact any proof of their existence.

4927, 6288.

Each of these examinations is conducted by a Board of three officers, appointed by the General Officer commanding the district in which the candidate is stationed. No member of the Board is to belong to the same regiment as the candidate examined. The examination is partly practical, and partly consists of written answers to questions set by the Board. The answers are corrected by the Board, who submit them, together with their report, to the General Officer in command. The latter forwards the whole proceedings, together with his own observations, to the Horse Guards, where the questions and answers are subjected to a final revision by the Adjutant-General. These examinations for promotion do not come within the province of the Council of Military Education.

Although no organization exists at present for the general instruction of the officers of the army, a very important establishment has been founded for the benefit of those who are desirous of qualifying for appointments on the Staff.

Staff College.

The Staff College was established in consequence of the report of the Commissioners appointed in 1856 to inquire into the training of officers for the scientific corps. Before this period, a branch of the Royal Military College at Sandhurst had existed, under the name of the "Senior Department," at which a certain number of officers were permitted to study the higher branches of military science.

Admission to the College.

The College consists at present of 30 students, 15 being admitted annually. It is open to officers of all arms of the service, except those of the Royal Engineers, who, on the

ground of the professional instruction they have already received, may be appointed to the Staff without passing through the College. Admission is determined by an annual competitive examination. Candidates must have been five years in the service, and produce certain certificates of their fitness for Staff employment. Restrictions are placed upon the number of candidates who can be admitted from the same regiment. 1383.

The subjects of the competitive examination for admission to the College are to a great extent of a military character. They comprise military history, fortification, military drawing, natural and experimental sciences, French, German, Hindustani, and mathematics. A candidate may offer himself for examination in all the subjects. A large preponderance of marks is assigned to mathematics, the lower portions of which, as well as one of the three languages, are obligatory, and in these subjects every candidate must reach a certain standard of proficiency. Subjects examinati

The course of study at the College lasts for two years. The subjects taught fall under two categories, the former comprising such as have a more immediate bearing on the duties of Staff officers, while the latter are of a less professional character. The comparative merits of the students are decided by a series of competitive examinations in eight subjects. The purely military subjects, five in number, and one of the three languages taught at the College, viz., either French, German, or Hindustani, are obligatory upon every student. Of the non-military subjects an officer is allowed to select any two, the marks gained in which count towards his place in the final examination. Any officer may further offer himself for an honorary certificate in any or in all of the other subjects taught at the College, and also in any modern language; but his place in the competitive list is not affected by the result. Course of study at t College. 1396 to 1418; Col. Lacy, rep

The College course is divided into two distinct periods, a certain portion of the instruction being concluded at the end of the first year. The order of merit, however, in which the students are placed on leaving the College, depends on the total aggregate of marks gained in a series of examinations spread over the whole term of residence. A fixed minimum number of marks must be obtained by each student to entitle him to a qualification for the Staff.

After leaving the College, officers are attached for a short period to those branches of the service to which they do not themselves belong, for practical instruction in drill: after this they are considered qualified to hold Staff appointments.

Officers of the Engineers, substantive field officers who before the first of January 1860 had attained the rank of lieutenant-colonel, and officers of proved ability in the field, are qualified for Staff employment without passing through the Staff College. Exceptio regarding Staff appointment

As soon as the College is in a position to supply all vacancies on the Staff, no officer, with the above-mentioned exceptions, will, according to the Regulations, be appointed to the Staff who has not passed the final examination at the College. In the meantime, however, officers can be appointed directly to the position of brigade major, and to the Adjutant-General's and Quartermaster-General's departments, without passing through the Staff College. In such cases they are subjected to a qualifying examination to test their fitness for the appointment, unless they are of the rank of lieutenant-colonel, in which case they are exempt from examination. Military secretaries, assistant military secretaries, and aides-de-camp, who, as forming the personal Staff of a General Officer, are selected by the General himself, are likewise appointed without a previous education at the Staff College. Military secretaries are not examined on appointment; assistant military secretaries and aides-de-camp are required to pass a qualifying examination. Queen's Reg lations, par 221. 1627.

The nature of the examinations for these direct Staff appointments is detailed in Your Majesty's Regulations, paragraph 221. The subjects vary according to the importance of the appointment. The examination is in each case of a two-fold nature. One part, having immediate reference to regimental duties, drill, and discipline, is conducted by a board of officers appointed by the Adjutant-General: the other, being of a more general character, has been placed under the Council of Military Education. The subjects of examination for the subordinate appointments of assistant military secretary, brigade major, and aide-de-camp, include English composition, one foreign language (selected by the candidate), rough military sketching, and field fortification. Examinations for direct Sta appointments. 1605 to 1608

For the Adjutant-General's and Quartermaster-General's departments the examination is of a higher order, and, in addition to the above subjects, includes more finished military sketching, practical geometry and trigonometry, castrametation, permanent fortification, and military history and geography.

One other military instructional establishment remains to be noticed,—the Survey Class at Aldershot. It comprises two courses:—an elementary course of three months, including practical geometry, plan drawing, the construction and use of scales, and mili- Survey Cl at Alder shot.

tary sketching; and a more advanced course, consisting of reconnaissance and road reports, field fortification, the attack and defence of posts, the tracing of field works, camping, and the construction of field ovens. Attendance at this class is purely voluntary; the institution is confined to Aldershot, and no advantage is proffered to officers who pass through it.

Major Woolsey, replies.

Review of existing institutions.

On a review of the general system of instruction afforded to officers of the army, both before and after they have joined the service, as summarized in the foregoing epitome, it might at first sight appear that very extensive and satisfactory machinery exists for the accomplishment of this desirable object: but on a closer examination of the various parts of which it is composed, it will be found that some of the institutions fail in discharging as completely as might be wished the functions for which they were designed; that others, though admirable in themselves, operate only over a small area; and that the relations of most of them to each other and to the army are so loose and disjointed as greatly to interfere with the completeness of the results they were intended to accomplish.

These conclusions will perhaps, for the present, be sufficiently developed by means of a brief memorandum addressed to the special points referred to us in the instructions we have received from Your Majesty, to be followed by a more detailed statement of the specific recommendations we are desirous of making with reference to the several Military Educational Institutions of the country.

1. *The limits of age within which candidates for the several combatant branches of the military service should be commissioned by Her Majesty.*

Age for entering the army.

Duke of Cambridge, Lord W. Paulet, Sir H. Storks, Maj.-Gen. Napier, Maj.-Gen. Carey, Col. Stephenson, Col. Hort, Col. Baker, Lord Walden.

A majority of the military witnesses whom we have examined have been unanimous in evincing an anxiety that officers should enter the service young. In support of this opinion great stress was laid by some witnesses on the disadvantage arising from the presence in the higher ranks of the army of officers who, in consequence of the mature age at which they joined, have already lost something of their youthful energy and vigour at the very period of their career at which a call was most likely to be made upon those qualities; while it was urged with scarcely less earnestness by others that the early dawn of manhood was a period of life at which the disposition was most docile, a professional aptitude most readily acquired, and habits of obedience, and a due appreciation of the necessity for discipline, most cheerfully recognized.

The Line.

Accepting this opinion, we recommend that candidates for Direct Commissions in the Line should, with a special exception in favour of University graduates, be required to qualify between the ages of 17 and 20.

1660.

Artillery and Engineers.

Similar considerations have been urged in favour of the admission of officers to the scientific corps at an equally early age; but as in this latter case a much higher preliminary training is required, the age of admission of cadets to the Artillery and Engineers, after their training at Woolwich is completed, must of necessity be somewhat later. We have been so impressed, however, by the evidence in favour of the early admission of officers even into these corps, that, as will appear later, we propose 16 to 18 as the age of admission to Woolwich in place of 16 to 19, the present limits.

6605.

6717, 9305.

Sandhurst.

A somewhat similar rule has been applied to Sandhurst. Although the requirements to be exacted from the students at this latter establishment will not be of so highly scientific a character as those demanded at Woolwich, the course we recommend will be as long. Under these circumstances we have fixed on 16 to 17 as the limits of age within which candidates should be allowed to compete for admission into Sandhurst, the present limits being 16 to 19.

Duke of Cambridge, 5332, 5364.

As the alterations we propose in the age of admission to the service will in many cases affect the interests of young men who have been educated with the view of entering the army under the existing regulations, we consider that, in justice to such candidates, a certain period should be allowed to elapse before the recommendations we have made are carried into effect, and that in the meantime due notice should be given to the public of the proposed changes.

2. *The qualifications which the candidates for each of those branches should severally possess in intellectual capacity and general knowledge to entitle them to admission to Her Majesty's Service.*

Qualifications on

Officers about to enter the Artillery and the Engineers may undoubtedly be expected to possess more special qualifications as well as somewhat higher acquirements

than are necessary to an officer of the Line for the performance of his ordinary regimental duties. Nor do we think it either possible or desirable to exact from every candidate for the Line proofs of exceptional ability or extensive reading. entering service. 1713, 3942

Indeed, it would appear that some of the smartest and most capable officers of the army have been furnished direct from the Public Schools, without having exhibited any great scholastic proficiency. At the same time, it is evident that the possession of mental faculties disciplined and developed by intellectual training, and of a store of well-digested information, must greatly enhance the individual value of any officer employed in Your Majesty's service; while, on the other hand, no person would be fit to hold a commission, whose educational acquirements were not sufficient not only to enable him to discharge the routine duties of his profession, but also to maintain an ascendancy over those he would be called upon to command. 1709, 4834, 5

The foregoing considerations would point to the maintenance of a very high standard of qualification for the scientific corps, and to such a scale of qualifications for the Line as would secure in that branch of the service not only officers respectably educated, but also the admixture of a certain number possessed of superior attainments and of more than average ability. Scientific corps. The Line.

It is with this end in view that we have modified or remodelled the several examinations we now recommend for candidates passing in and out of Woolwich and Sandhurst, as well as for applicants for Direct Commissions.

3. *The method of examination, or otherwise, by which these qualifications may be tested and ascertained by examiners specially appointed, or by diploma or certificate from the Universities or Public Schools.*

As a good method of examination is almost the only means by which the presence of the foregoing qualifications can be ascertained, it is evident that the efficiency of any educational system can only be secured by rendering these educational tests stringent and genuine. It is also of great importance that the standard of acquirements insisted upon should be permanent, uniform, and unaffected by the caprice or fancies of individual examiners. Method o examinati

We would therefore recommend that all examinations of a military character should be placed under the control of one responsible head. At present the functions of superintending the examinations, and of directing the whole education of the army, are discharged by the Council of Military Education. It is doubtful, however, whether the responsibilities now distributed amongst five individuals might not with advantage be concentrated in the hands of a single person, as Director-General of Military Education, assisted by such a staff as circumstances might require. Whatever arrangement may be adopted in regard to the examinations, especial provision should be made for a periodical change in a certain proportion of the examining body. By the annual accession of a new member to colleagues who have been for some years in office, the traditional uniformity of system would be preserved, while a certain degree of freshness would be communicated to the examination papers. This last point is of great importance, as it is well known that the efficiency of many examinations is much impaired by the skill with which a class of persons, popularly known as "crammers," divine the style of papers likely to be set by examiners whose fertility of interrogation has been exhausted. Superinte dence of e amination and of Mi tary Educ tion. 305, 4542, 95

Although recommending the above organization to be applied to all examinations relating to military subjects, we see no reason why examinations of an ordinary nature should not be conducted by the Civil Service Commissioners. We would therefore suggest that the examinations for admission to Sandhurst and to Woolwich, as well as those for Direct Commissions, all of which will be confined to non-professional subjects, should in future be transferred to that department. By this arrangement the duties of the military examiners would be much lightened. 4521, 9561

We do not consider it advisable that Public Schools should be empowered to grant certificates entitling their holders to admission into the army; but a student who has passed Responsions at Oxford, or a corresponding examination at other Universities, should be held qualified to receive a Direct Commission, provided always he be within the prescribed limits of age. Certificate from Publ Schools a Universit

It may here be convenient to point out that we recommend an important change in the system of assigning marks to subjects taken up for competition in the examinations for admission to the various Educational Establishments. In this we follow a practice now adopted in the Indian Civil Service examinations, by which the minimum of marks fixed in each subject is deducted from the total number gained in it. The object of this rule is to discourage the practice of taking up extra subjects imperfectly known, Changes proposed the syster of marks the exami nations.

in the hopes of gaining a very few marks more than the required minimum, and thus swelling the ultimate total. Mathematics have of late been excepted from this rule in the Indian Civil Service examinations, on the special ground that candidates need some encouragement to select a subject involving so much labour; but as we have required a certain moderate amount of mathematical knowledge as a qualification, there is no reason for putting a further premium upon it in the military examinations. We do not propose to remove the restriction which now exists limiting the total number of subjects taken up, since no candidate can be expected to be thoroughly prepared in more than a few. By these arrangements, combined with others to which we shall refer, we hope to place some check upon the present system of "cramming."

8887, 9637.

9605.

As there is no competition, strictly speaking, at the Direct Commission examinations, the temptation to "cram" for them is less powerful. In their case, therefore, we have not applied this stringent rule. Its extension to all examinations appears, however, to be a matter for future consideration, if it be found that the candidates still continue to come up trusting to subjects which have been hastily forced into them, instead of having been systematically taught.

Moral and physical qualifications.

Before leaving the general subject of Examinations, we wish to record our opinion, that a purely scholastic examination is not the only test by which the future officer's competence should be investigated. However valuable intellectual ability may be, his possession of other qualities, both moral and physical, is equally important. Although it may be very difficult to devise any scheme for testing the presence of these latter qualities in applicants for Direct Commissions, there does not seem to be any reason why the developement of them should not be encouraged at the various Military Educational Establishments with which we are dealing, while it is very obvious that they should be demanded from every officer who is a candidate for Staff employment.

5381.

6008, 8615.

The methods we recommend for carrying these views into effect will be best described in those paragraphs of our Report which more especially refer to Sandhurst, Woolwich, and the Staff College.

4. *How far the existing establishments of the Royal Military College at Sandhurst and the Royal Military Academy at Woolwich are adapted for the promotion of military education, and whether any alteration or amendment should be made in their present constitution and discipline.*

Royal Military College, Sandhurst.

With regard to the efficiency of the Royal Military College, the evidence we have received has not on the whole been favourable. It is certain that not long since Sandhurst was in an unsatisfactory condition: and although of late a great change for the better has taken place, there is still considerable room for improvement. This condition of affairs may be attributed to two especial circumstances :—the absence of any concentrated authority in the hands of the Governor, and the presence in the College itself of a hopelessly idle element, composed of young men who, finding shortly after their arrival that they have no chance of obtaining a commission without purchase, lapse during the remainder of their stay into a condition of sluggish indifference, alike pernicious to the intellectual and moral tone of the institution. This demoralized and demoralizing leaven is still further reinforced by an adjunct in the shape of the Queen's and Indian cadets. These latter young men, having been promised a free commission on entrance to Sandhurst, without being required to pass any but a very low qualifying examination, have, if anything, even less incentives to industry and emulation than the other class of students to whom we have referred.

Main causes of its unsatisfactory condition.

318, 3849; 2155, 2954, 3394, 5296.

34, 2157, 2748, 654.

Further defects in its constitution.

But although the unsatisfactory condition of Sandhurst may partially be referred to these two obvious defects in its present organization, there are other circumstances scarcely less prejudicial to its efficiency as an educational establishment.

Among these may be enumerated the predominance of the military over the educational element, and the limited authority accorded to the officials charged with the duty of instruction as compared with the powers of discipline entrusted to the executive portion of the staff.

45, 2165, 2287, 004.

But perhaps the most obvious defect of all is the want of any recognised personal and confidential relationship between the students and the various authorities of the College. We have found but few traces of that domestic intimacy between pupil and teacher which forms so striking a feature at our Public Schools, and even the Chaplain scarcely seems to possess those opportunities of familiar intercourse with the young men which exist between every parish clergyman and his parishioners.

863, 4037, 4464, 013.

1189, 4440.

Prejudicial effects of

A further disadvantage to the College, and one unfortunately beyond its own control, arises from the fact that scarcely any of the candidates who apply for admission within its

walls have the courage to face the very moderate examinations they are required to pass without going for a certain interval of time to a "crammer's." "cramming" establishments.

From the evidence before us it appears that this "cramming" process is almost universally resorted to by those who seek admission to the two military colleges, as well as by candidates for Direct Commissions, of whom scarcely more than five per cent. can be traced as coming straight from the great Public Schools. This practice cannot be too much deprecated. However able the gentlemen may be who make it their profession to meet the demand thus created, and however earnest their desire to give a good moral tone to their establishments, it is but too evident that from the age of the pupils, the short period of their stay, and the indiscriminate welcome almost necessarily offered to all who seek such assistance, it would be difficult for the most conscientious and high principled gentleman either to maintain discipline or infuse a high moral tone amongst the heterogeneous and shifting squads of pupils who pass through his hands. As a consequence, much of the good acquired at a Public School seems to be lost by the pupil during this intervening stage in his career; and many of our witnesses, including some young officers who had but recently quitted Sandhurst, referred a good deal of what was unsatisfactory in the character of a portion of the students of that establishment to the demoralizing influences to which they had been subjected during their passage through the pupil-room of the "crammer."

1221, 3793.

155, and Return

4256, 4330.

Duke of Cambridge, Col. Hallewell, Col. Addison, Ens. Mott, Ens. Dering.

Though the foregoing criticisms comprise the most glaring defects in the constitution of the Royal Military College, there are others, less directly affecting the character of the students, but equally injurious to the institution, to which our attention has been called. Among these may be reckoned the double staff of professors and executive officers, with the consequent multiplicity of officials and the unnecessary expense thereby entailed, the bad accommodation afforded to a great proportion of the students, and the absence of that privacy which is even more important for young men of the age of 16 to 19 than for boys at school.

Minor faults disclosed.

897, 3518.

3567, 5269.

The many imperfections disclosed, during the course of our investigation, in the organization of Sandhurst led Your Majesty's Commissioners seriously to consider whether it would be advisable to preserve an institution open to such strictures. They were still further induced to engage in the consideration of this preliminary question by the strong preference shown by some Commanding Officers for the Public School boy over the Sandhurst cadet, as a recruit for their regiments. Several of the witnesses whom we examined on this point agreed in regarding the drill acquired at the Military College as worse than useless; not only slovenly and imperfect in itself, but encouraging the young officer to imagine he might disregard the elementary instruction which awaited him in his regiment; while, on the other hand, it neutralized that sense of novelty which enables a young man who comes fresh to the work to go through its drudgery with spirit and interest. Besides the witnesses who took this discouraging view of the practical aptitude acquired by the students of Sandhurst, some appeared to entertain a very low estimate of the scientific knowledge brought away by the great mass of them. Others, however, spoke of the College in different terms, and deprecated very earnestly the abolition of an establishment which they considered of the gr[illegible]t service to the army. Striking occasions were also referred to by some witnesses, when the technical information acquired at Sandhurst had proved of the greatest use both to themselves individually and to others on critical occasions; while many laid still greater stress on the necessity of preserving the only institution in the country where anything like a scientific education is afforded to any of the future officers of Your Majesty's line regiments.

Question of the retention of the College.

Lord W. Paulet, Sir P. Herbert, Maj.-Gen. Whit, Col. Hort.

4966, 5110, 5917.

4824, 4842.

2948, 3373.

4916, 5137, 9334.

3221, 4977.

Duke of Cambridge, Lt.-Gen. Forster, Sir D. Cameron, Maj.-Gen. Napier, &c.

After maturely weighing the various considerations of the above nature brought to their notice, Your Majesty's Commissioners are not prepared to recommend the extinction of Sandhurst as a military college. The very prominence of the blemishes observable in the institution only confirmed them in this opinion, by encouraging the hope that a change of system and the excision of what was objectionable might lead to more satisfactory results. The moral and proper mental training of a body of 200 young men between the ages of 16 and 19 ought not to be an insoluble problem; while the annual accession to the army of 100 young officers of superior intellectual ability and well grounded in many of the technical subjects connected with their profession cannot fail to prove a continual advantage to that arm of the service in which they are enrolled.

The re-organization, but not the extinction of the College recommended.

730, 1879, 3797, 5311.

The recommendations, therefore, with regard to Sandhurst which the Commission are prepared to make, may be summarized in the following paragraphs, viz.:

Remedies proposed.

1. That the authority and the individual responsibility of the Governor should be considerably increased, and that his position, both in relation to the staff of the College and its students, should be more nearly assimilated to that of a head-master at a Public

Position and powers of the Governor.

School. With this view, we think that he should, in a great measure, determine the appointment or removal of the professors and instructors under his direction; that the amplest means of enforcing discipline should be placed at his disposal; and that, at the very least, he should be invested with an absolute power of rustication. The dismissal of a student must necessarily, we consider, be subject to the approval of the Secretary of State.

178, 3318, 3956, 100, 5214, 5396.

Qualifications for the post.

We feel very strongly that the character and efficiency of all educational establishments depend on nothing so much as on the personal qualifications of the individual at their head; and that the best devised academical system will break down unless pervaded and stimulated by the controlling intelligence of a mind specially fitted for the performance of the peculiar duties connected with such a charge. We have, therefore, proposed to attach such a salary to the governorship of Sandhurst, as will render that office worthy the acceptance of a person of superior attainments. We desire also most strongly to express our opinion that the post should be occupied by some one selected for his educational capacity rather than for his military services. So greatly were we impressed with the importance of this last distinction, that some of us were of opinion that it might be an advantage to allow the Governor of Sandhurst, should the Secretary of State see fit, to be a civilian; but the majority of the Commission ultimately decided that it would be more consistent with the general character of our scheme that a military man should preside over the College.

5521, 5808.

3049, 5013.

5363.

Free commissions to be granted to all admitted to the College.

2. That the number of cadets annually admitted to the College should be, as far as possible, proportionate to the number of free commissions placed by the War Office at its disposal. The object of this arrangement is to get rid of that injurious element of idleness referred to in a previous paragraph. As long as the number of prizes to be contended for is limited, so long will there be a class of youths who, having convinced themselves of their inability to excel, will lapse into a chronic state of idleness. If, however, some great advantages be offered to all those who comply with the necessary conditions of study, not only can the most absolute submission to those conditions be exacted, but admission to the College will become such a boon that it will be possible to test the candidates by the ordeal of competition, which now exists only in name. With this view we recommend that, the number of free commissions placed annually at the disposal of the Royal Military College being about 100, the number of cadets annually admitted should also be 100. This arrangement, with a two years' course of instruction, will maintain the number of resident students at about 200; or, if we allow a certain per-centage for failures, at about 210; of whom one-fourth will pass out every half-year with free commissions. Since every cadet once entered upon the books of the College will become absolutely entitled to this advantage, provided only he displays the requisite amount of industry, ability, and good conduct, it may be expected that the chances of admission will be eagerly sought after by the public. Taking advantage of this circumstance, we propose that all admissions into Sandhurst should in future be determined by open competition. As a result, we may confidently expect that the students of the re-organized institution will possess more than average ability or superior industry.

753, 1787, 2159, 2955, 8005.

Returns.

Admission to be by open competition.

Character of the competitive examination.

In determining the character of the entrance examination we have sought to harmonize the list of subjects more completely with those taught at the great Public Schools. We have done this for two reasons: in the first place, in order as much as possible to render it unnecessary for the candidates to resort to the intervention of the "crammer;" and in the next place, for the purpose of encouraging the acquisition of the groundwork at least of a liberal education before they devote themselves to the special professional course which awaits them at the College. The fact of a Modern Department having been instituted at Cheltenham, Marlborough, Wellington College, and within the last year at Harrow, will probably induce other schools to adopt the same arrangement; more especially as we have had it put very distinctly before us in evidence that where those modern departments exist, the students are more ready to present themselves for examination without having resort to the irregular system of "cramming" we so earnestly deprecate.

5710.

189, 1701, 2092, 2187, 2429.

5692, 5739.

On the policy of establishing a liberal education as the basis of professional instruction we need not insist. If anything, we should rather defend ourselves from the imputation of having interrupted at too early an age the liberal studies of those we invite to enter Sandhurst: but taking into account the somewhat conflicting elements of the problem remitted to us, and having especial regard to the importance of the cadet entering the army as young as is consistent with his acquisition of the technical and scientific education it is desirable he should receive, we consider we have made the best compromise that the circumstances of the case permitted. We may expect to find amongst

1757, 3375, 4854, 479.

the candidates a large proportion of young men of more than average ability. If so, it is not unfair to presume that by the age of 16½, which will be the average age of admission, they will already have obtained the essentials of a sound liberal education. And in order that the requirements of this nature should not be overlaid and stifled by the more professional studies at Sandhurst, we propose to allow any student who may desire to do so, to incorporate Latin and Greek into the list of subjects for which he is to receive marks at his examinations within the College. 5792.

The same prospects of advantage which will make admission to Sandhurst an object of desire will still more strongly tend to render dismissal from its precincts a dreaded punishment. This circumstance will be a powerful auxiliary in the maintenance of discipline. On reference to the detailed scheme for the re-organization of Sandhurst, it will be seen that we have adopted periodical examinations, of a somewhat stringent character, conducted entirely by persons independent of the College, as tests of the student's perseverance in those habits of industry with which the very fact of his having won admission into the College entitles us to credit him. Should any cadet fail to pass these examinations, or depart from the good conduct we have a right to exact from every one to whom a free commission, with its attendant advantages, is to be granted, he should be dismissed. Securities for discip and indus 9336.

These ordeals, recurring at intervals during the course of study at the College, and accompanied, as they are, by such other securities for the maintenance of order as are usual in all educational establishments, will probably prove sufficient to maintain a far higher standard, both of morality and industry, than has hitherto prevailed at Sandhurst, even if the conditions under which the young men will in future enter the College do not prove, as we trust they will, satisfactory guarantees for their good behaviour and gentlemanlike tone. 4122, 436

The examination at the end of the course, the length of which we propose to increase to two years, will be competitive; and, as a further incentive to industry, we recommend that, in addition to their commission, an exemption from the examination for the appointment of aide-de-camp should be granted to the more distinguished students. 3804, 528

Although the arrangement is attended with some difficulty, we have suggested that good conduct should be recognized as an element of excellence, in the ultimate appreciation of the comparative merits of the students. 5405.

We should have been glad to have applied the same principle to the physical training of the cadets, as it is obvious that young officers should be thoroughly accomplished in all manly exercises, more especially in riding; but, after carefully considering the question, we have been unable to assign any value in the final competition to superiority in these respects, and have contented ourselves with requiring from all students a due amount of proficiency in riding, fencing, swimming, and gymnastics. 2323, 387

3. The further alterations we recommend, though of minor importance, will probably combine beneficially with the improvements suggested above. We propose altogether to abolish the distinction which has hitherto existed between the instructional and executive staff. By this amalgamation, and the consequent reduction of the *personnel*, a decrease of expense to the amount of 7,000*l.* a year will be effected, while the instruction administered will probably gain in efficiency when it proceeds from persons charged with the duty of enforcing discipline. Amalgan tion of t instructi and exec tive staf 3330, 304

We have also suggested that the professors and instructors should be more intimately associated with the educational and tutorial, as distinguished from the mere instructional, machinery of the College. With this view we have recommended that they should occasionally unite under the presidency of the Governor as a consultative Board for the purpose of entering upon a periodical review of the condition of the establishment and the course of study. Somewhat similar Boards exist in the French and Prussian military schools. Institutio of a Coll Board. 2229, 524 Report

Finally, we recommend that an annual inspection of the College, both in respect to its discipline and the instruction it administers, should be made by an independent Board of Visitors appointed by the Secretary of State, and that their report should be presented to Parliament. It must always be remembered that any educational institution maintained by Government differs from an ordinary Public School, in the fact that the interests of those who conduct it are not so intimately associated with its prosperity as is the case with persons whose professional position greatly depends upon the amount of public confidence they are able to inspire. With whatever certainty, therefore, we may have a right to count on the zeal and devotion of those who may be connected with the Royal Military College, we consider it of the greatest importance, in justice both to them and to the public at large, that this essential guarantee of inspection should be secured. Annual inspectio

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With regard to the Royal Military Academy at Woolwich, Your Majesty's Commissioners can have no hesitation in recording their opinion in favour of its maintenance for the instruction of those officers who propose to enter the two scientific corps. So far as the system of instruction there adopted is concerned, we are of opinion that it has, on the whole, been satisfactory. Such changes as we propose will have a tendency to render the course of study less severe, to reduce the number of subjects, to moderate the undue prominence now given to mathematics, and to limit the obligatory course to such instruction as is common to the Artillery and Engineers.

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tion.

If we look beyond the system of instruction to the general tone and discipline of the Academy, it is apparent that defects analogous to those we have noted in the case of Sandhurst may also be alleged against the present organization of Woolwich. Amongst these may be mentioned the too limited authority of the resident head; the broad distinction existing between the officers commissioned to instruct and those charged with the maintenance of discipline; the absence, more or less, of those personal relations between those placed in a position of authority and the students, to which we are disposed to attach so much value; and the want of facilities for the administration of religious instruction by the Chaplain.

6779, 7536.

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For the correction of these blemishes, so far as they are similar in their nature to those existing at Sandhurst, we recommend that remedies should be applied similar in their general character to those which have been already more elaborately described in the paragraphs referring to the latter establishment. One serious source of mischief, the presence of which we had discovered at the Military College, is happily absent from the Royal Military Academy; we allude to the idle element located in permanence at Sandhurst. Of this there is no trace at Woolwich, at least as seriously impairing its educational system. There are probably idle cadets at the latter place as well as at the former, but they do not form themselves into a compact sediment. As no one can enter Woolwich without a considerable amount of application, and as a commission is an assured reward to continued industry, the incentives to study—stimulating habits of application already acquired—more than counterbalance the temptations in an opposite direction.

ppendix, p. 37.

The modifications which seem to us desirable in the constitution and discipline of the Academy are detailed at length in the plan which we append for its future organization. By the changes proposed increased efficiency will be communicated to the establishment, while at the same time a saving of 6,000*l.* in its annual cost will be effected.

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Before we leave this part of our Report, we feel bound to say that from the Hospital Returns which have been laid before us, and from the statements made by several witnesses, it is but too evident that among the cadets both of Woolwich and Sandhurst a considerable amount of immorality prevails. It appears that offences of this kind are in no way punishable, are not necessarily noticed by any person in authority, and, while

, 3702, 6812.

they are regarded as venial by the cadets themselves, are not reported either officially or confidentially to the parents or friends of the youthful offender. The consequence is that offences of this class, more especially on occasions when leave of absence is granted, are of very frequent occurrence.

, 5710, 5804.

We cannot but believe that in these places of education, where the age of the students differs but little from that of boys in the upper forms of Public Schools, a higher tone with respect to vice of this kind might be introduced and maintained; and we confidently commend this question of moral discipline, so important alike in its physical and its moral bearings, to the earnest consideration of the authorities.

5. *At what ages and under what conditions candidates for the several combatant branches of the service should be admitted thereto.*

In a previous paragraph we have had occasion to note the preponderance of opinion amongst the witnesses we have examined in favour of the officer entering his profession at as early an age as possible, both on account of his greater docility and his keener aptitude for military duties when quite young. These arguments apply perhaps even

367, 9325.

with greater force to those who are about to enter a branch of the service where promotion is so seriously retarded as it is in the non-purchase corps. On the other hand, a counter-

1973, 6038.

vailing allowance has to be made with regard to those who are destined for the scientific corps, and require in consequence a preliminary academical training, inasmuch as it is not

until their understandings have to a certain extent ripened, that they are in a condition to enter upon the course of instruction contemplated.

Age of admission Woolwich

Due regard being had to these diverse and almost conflicting considerations, we propose to restrict the limits of age for admission to Woolwich to 16 and 18. At present candidates can enter between the ages of 16 and 19, and as the course of instruction lasts for two years and a half, it sometimes happens that a young man does not obtain his commission until he is nearly 22 years old. The lengthened period for admission left open under this arrangement is productive, we have been assured, of further inconvenience by introducing an undesirable discrepancy of age between the students. A method of treatment which is well suited to a youth of 17 may often be totally inapplicable to a full-grown man of 20. By narrowing the term for entrance, and reducing the length of the course to two years, this defect will in a great measure be removed.

Return 436.

to Sandhurst.

The same considerations which have indicated the proper period for admission into Woolwich apply, in a minor degree, to Sandhurst. Though the instruction to be communicated at the Royal Military College is not of so advanced and scientific a character as that conveyed during the course at the Academy, it is still of too special a kind to be undertaken with advantage by an immature mind. Moreover, as we have already observed, it is very desirable that no instruction should be rendered purely technical until after the foundations have been laid of a sound liberal education. With these views we have recommended that the period of admission to Sandhurst should be between the ages of 16 and 17.

2759, 393

1757, 705

Condition of admiss

With respect to the conditions of admission to either institution, Your Majesty's Commissioners are strongly of opinion that they should be those of open competition. This principle already prevails at Woolwich, and has been productive of the best effects. If any confirmation of their opinion were needed, it would be found in the evidence of Major Generals Sir F. Abbott and Sir J. Simmons, who, though at one time entertaining considerable misgivings on the subject, have now convinced themselves of the advantages of this system. At present, admission to Sandhurst is obtained by competition amongst those nominated by the Commander-in-Chief. We are decidedly of opinion that the competitive examination for entrance to Sandhurst should be rendered as free as it now is at Woolwich.

Lt.-Col. Wil Prof. Sylves replies.

1971, 651

805.

Characte the entra examina tions.

To the general character of the entrance examinations recommended by us we have already alluded. They have been designed with a special reference to the curriculum adopted at the most advanced of our Public Schools, and with the express intention of enabling the competitors to come straight from one of those establishments to the examination hall, without having occasion to resort to any intermediate place of study. With this view all subjects have been carefully excluded from the list which do not enter into the course of instruction at one or other of our great Public Schools. We hope thus, on the one hand, to diminish the temptation to resort to "cramming," and, on the other, to induce those of our great schools which have not established a "Modern Department" to adopt an arrangement which is perhaps destined to become an essential feature of most educational institutions. The introduction of a modern language into the qualifying examination is only an adaptation of the above principle, as there is scarcely any school in England where French or German is not now taught, while to no class is such an accomplishment likely to prove more useful than to military men.

5740.

5498, 567

The principal difference between the entrance examinations proposed for the two establishments, consists in the higher mathematical qualification required for Woolwich than for Sandhurst.

6. *Whether in the prescribed course for admitted students general knowledge should be combined with instruction in special professional subjects, or whether such special subjects only should be taught therein.*

The instr tion at Woolwich and Sand hurst to b mainly pr fessional.

As the immediate object of the institutions to which reference is made in the above query is, in the case of Sandhurst, to furnish the regiments of the Line with a proportion of officers exceptionally qualified for their profession, and in the case of Woolwich to educate young men for the scientific corps of the army, the principal object of each should be to communicate such instruction as is most likely to promote the professional proficiency of its students; and every other consideration should be subordinate to this result.

But oppo tunity to given for studying

In revising the courses of study to be pursued at Sandhurst and Woolwich respectively, we have kept this principle steadily in view, and have restricted the obligatory studies required at the intermediate and final examinations to such subjects as either

eneral ubjects.

directly or indirectly are connected with the military profession. In order, however, to afford every facility to those who possessing literary tastes or special ability are anxious to improve their general educational acquirements, we have introduced into the systems of both establishments several subjects of a literary rather than a technical character, including Latin, Greek, and some modern languages, to be included in the course, and taken up at the examinations at the option of the student.

7977.

We have been confirmed in proposing this arrangement by the evidence of several witnesses, who insisted on the loss to the service as well as on the hardship suffered by a good scholar, who, having taken a high place at the entrance examination in consequence of his proficiency in classics, finds himself at a disadvantage during the rest of his career at the Academy, in consequence of classical literature being altogether excluded from the course. In future, although his place in the general competition will mainly depend on the superiority of his attainments in such technical subjects as it is the especial province of the military colleges to teach, his subsidiary acquirements in classics will perceptibly improve his chances of success; and the same will be the case with respect to his proficiency in other branches of non-professional knowledge.

350, 7107, 7508, 068.

7. *What the course of instruction should be for candidates for the several branches of the service, and whether any and what alterations should be made in the several courses at present adopted in these establishments.*

Comparison f the in- truction at Woolwich nd Sand- urst.

The duties awaiting the cadets destined for regimental duty in the Line are so different from those of candidates for the scientific corps, that a somewhat different preparatory education would naturally appear suitable to each. At the same time, as the main object contemplated in the Sandhurst course is not only to fit the young officer for the performance of his ordinary regimental duties, but to prepare him to encounter those exceptional emergencies which, however much they may be beyond the daily routine of barrack life, are constantly recurring incidents in warfare, it is evident that in many respects the instructional system at Sandhurst and at Woolwich will coincide. Thus, on a comparison of the two schemes, it will be seen that almost the same amount of mathematics is obligatory at each, though, as a voluntary subject, mathematics will probably be carried much further at the Academy than at the College. Again, military history, military drawing, and even fortification, will be taught at both places; but the last in a much more elementary degree at the College than at the Academy. Mechanics and artillery science will be excluded from Sandhurst though occupying a very large and prominent place in the Woolwich course: instruction in military accounts and the conduct of military correspondence will be given at Sandhurst, but may be left to form part of the practical course for officers of the scientific corps after quitting Woolwich.

ppendix, p. 34 and 40.

Though led by the circumstances of the case to maintain these distinctions in the education to be given to those about to enter the Line and those destined for the scientific corps, we are decidedly of opinion that the educational course in the obligatory subjects for the Artillery and the Engineers should be identical at the Academy. The amount of instruction in any subject necessary for admission into the one corps, should be the limit of instruction required in that subject from those destined for the other corps. The further education of the Artillery officer and the Engineer officer in the higher and special branches which are peculiar to the requirements of their several services had better be postponed, as will be explained hereafter, until after they have passed out of Woolwich.

554, 6762, 7166, 526.

6964, 7492.

2018, 6769, 8150.

Alterations uggested n the pre- ent courses.

Having thus indicated the degree in which the cadet's education should be regulated in reference to the particular arm of the service he is to enter, it only remains for us to summarize the alterations we propose to introduce into the instructional courses at Sandhurst and Woolwich respectively. Their exact nature will be best observed by a reference to the two schemes of re-organization appended to this Report. A few words here will be sufficient to explain their scope and intention.

From the evidence submitted to us we are led to think that at present the subjects of study required at both places are too numerous, that the instruction is too diffuse, and in some branches is carried too high. At Woolwich the work, especially at the end of the course, seems more severe than is desirable, and the pressure of mathematics too great.

At Wool- wich. 6869.

These defects we have endeavoured to remove by diminishing the number of obligatory subjects at Woolwich, where all the subjects with one exception are at present obligatory; by reducing the standard of qualification in mathematics; and by

curtailing the extent of the courses in such subjects as geometrical drawing, and the execution of plates and surveys, to limits more in accordance with what will be practically useful; and by altogether omitting other subjects. At the same time, by giving high marks to those who evince a proficiency in the voluntary or in the higher branches of the obligatory subjects, and especially in mathematics, encouragement is offered to those gifted with special ability for such studies, without injury to others whose talents may lie in an opposite direction. 6596, 6933, 706 7860.

By modifications in this sense we have been enabled to reduce the course at Woolwich to two years from its present period of two years and a half, an alteration recommended by several important witnesses. Col. Field, Lt.-Col. Owe Lt.-Col. Wils &c.

The general tendency of the changes proposed at Sandhurst will be to diminish the value attached to mathematics in comparison with other subjects, to confine the course of fortification to limits more in accordance with the knowledge required in officers of the Line, to exclude the study of chemistry and geology, and to introduce instruction in military accounts and correspondence as part of the regular course. In the voluntary course opportunity will be afforded to men of classical or literary tastes to continue their previous studies. The number of subjects of examination will be limited; and as the course will at the same time be increased from eighteen months to two years, it is hoped that the knowledge acquired will be of a more thorough character than at present. In order to secure this object, the standard of qualification required for a commission will be very considerably raised. At Sandhurst. 2961. 531, 2148, 37

There are some further changes of less importance, which will be found embodied in the schemes already referred to, including a re-arrangement of the class rooms at Woolwich, into which at present two classes are usually crowded at the same time. 6759, 7531

It may be convenient to introduce here a summary of the subjects that we propose should be taught at the two institutions to which the present query refers. Proposed courses of instructio

SANDHURST.

Obligatory subjects.	*Voluntary subjects (two only of which can be selected).*
Mathematics to plane trigonometry.	Higher mathematics.
Field fortification and elements of permanent fortification.	Latin.
Military drawing, field sketching, and reconnaissance.	Greek.
Military history and geography.	A second modern language.
Military accounts and correspondence.	English literature and history.
French or German.	Freehand drawing.
Elementary physics.	

WOOLWICH.

Obligatory subjects.	*Voluntary subjects (three only of which can be selected).*
Mathematics to plane trigonometry.	Higher mathematics.
Field and permanent fortification.	Higher fortification.
Artillery.	Latin.
Military drawing, field sketching, and reconnaissance.	Greek.
Military history and geography.	French.
Practical mechanics and application of mathematics to machinery.	German.
	Chemistry.
	Freehand drawing.

8. *Whether these establishments should continue as at present existing and originally designed, viz., as separate and unassociated, with different conditions of admission; or whether they should form one establishment only, open to all candidates upon one standard of qualification; or whether these two principles might not be so combined as to admit of a certain proportion of students from one being annually admitted to the other.*

The amalgamation of the Royal Military Academy at Woolwich with the Royal Military College at Sandhurst has been from time to time suggested as a desirable object, and Lord Dalhousie, when Secretary of State for War, directed Major-General Lefroy to draw up a scheme by which such an operation might be effected; but the evidence we have received is almost unanimously unfavourable to such a proposal, and Amalgama tion of Wo wich and Sandhurst not recom mended.

7938, 7948. Major-General Lefroy himself has changed his opinion, and is no longer inclined to advocate any such arrangement.

1116, 6654, 6925, 7101. One of the principal arguments advanced in deprecation of the union of the two institutions is founded on the injury likely to accrue to Woolwich by the reduction of the standard of education now maintained there to the lower level which prevails at Sandhurst. Although the force of this objection will, we trust, be considerably weakened by the improvements we have suggested in the organization of the Military College, the general tenor of the educational course we have prescribed for the cadets of Sandhurst with a view to their entrance into line regiments, as well as to their difference in age, is so distinct from the preparatory instruction suitable for officers of the Artillery and Engineers, that we are disposed to adhere fully to the opinion so strongly expressed 6444. by His Royal Highness the Duke of Cambridge, and most of our other witnesses, and to maintain Woolwich and Sandhurst as totally distinct establishments.

6927, 7199. The advantages afforded by the proximity of the Arsenal to young men preparing for the scientific corps may be urged as a subsidiary consideration in favour of the foregoing conclusion.

There does not appear to be any objection to allowing students of Sandhurst, as at present, to compete for admission into Woolwich, provided they be within the prescribed age.

9. *The method in which encouragement could be given in Public or Private Schools to education in general or special subjects adapted for candidates to be admitted into the military service of the Crown.*

Encouragement to general education at civil schools. We do not think that it would be possible to give greater "encouragement in Public or Private Schools to education in general subjects" than by the principle we have laid down: viz., that the only method of admission to the two great Military Educational Establishments of the State should be by open competition; accompanied as the enunciation of that principle has been by a plan for bringing the entrance examinations into as complete harmony as possible with the ordinary course of education pursued at those schools. The modifications we have introduced into the method of examination 6391. and the character of the subjects taken up, with a view to discourage "catch" questions and deprive "cramming" of its advantages, will also have a powerful tendency in the same direction.

Military instruction at such establishments. The further question as to whether it would be possible, or, if possible, desirable, to give special instruction in subjects connected with the military profession at our Public Schools, is more complicated. In reference to this point we have taken the evidence of four masters connected with great Public Schools, viz., Dr. Barry, formerly Principal of Cheltenham College, Mr. Southwood, head-master of the Modern Department at Cheltenham, Dr. Benson of Wellington College, and Dr. Temple of Rugby. Of these gentlemen, Mr. Southwood considers that no difficulty occurs in incorporating such 5564 to 5624. instruction with the curriculum of the "Modern Department" at a great school, and he states that fortification and surveying are actually now taught at Cheltenham with success. Dr. Barry, in a less positive degree, inclines to take the same view, but 5440 to 5547. attaches more importance to modern liberal education, and less to special instruction, as a preparation for the army. Dr. Benson, while disposed to believe it possible to give 5649 to 5734. more technical instruction, seems doubtful of its expediency, from a fear that it might narrow and curtail the scope of that more general education which should be the foundation of all professional knowledge. Dr. Temple is even less favourable to the 5741 to 5770. introduction of any special and technical instruction at the existing Public Schools, on the ground that it would impair the efficiency of the classical education, which he considers it is their special object to give.

While unwilling to discourage the teaching of special military subjects at schools which from various causes may have a specially military connexion, the Commission 5125, 5338. are not prepared to recommend the introduction of such teaching into Public Schools generally. Convinced as they are by the unanimous testimony of the witnesses who Duke of Cambridge, Lord W. Paulet, Sir H. Storks, Sir P. Herbert, Sir F. Abbott, Maj.-Gen. White, Col. Halliewell, Col. Addison, Capt. Bruce. have alluded to the subject, that our Public Schools as at present constituted furnish the very best material for the officering of our army, they have endeavoured to provide every facility and inducement to the youth of England to pass directly from their Public Schools into Sandhurst and Woolwich, or into the Line, without requiring additional tuition. If they can succeed in this, quite sufficient will have been accomplished, and the further instruction of the future officer in technical and professional 5119, 5162, 5811, 5225. subjects will be better deferred from his school-boy days to a later period in his career.

10. *The expediency or otherwise of providing that all candidates for commissions as combatant officers in the army (other than men promoted from the ranks) shall pass through a special course of study at Woolwich or Sandhurst, according to the branch of the service in which they are to be commissioned.*

Proposals to pass all candidates for commissions through a Military College.

The question of the establishment of one or more large Military Colleges, through which every person intending to enter any branch of the military service should be required to pass, is a project which, like that for the amalgamation of Woolwich and Sandhurst, has been frequently started and occasionally seriously considered.

We are, however, decidedly of opinion that institutions of this description would not harmonize with the general feeling of the country or with the views of Parliament, while we are disposed to think that the more varied and elastic system of education we have recommended for the instruction of the officers of the various branches of the service at successive stages of their military career will probably prove more effectual in itself, and more suited to the social characteristics of Englishmen. 1777, 5033, 5551

11. *Whether the course of instruction in the Staff College at Sandhurst for officers, the advanced School at Woolwich for the Artillery, and the Establishment at Chatham for the Royal Engineers, is adequate to fulfil the purposes for which those institutions have been respectively formed.*

Staff College.

Of all the establishments maintained by Government for purposes of military instruction, few probably might be rendered more capable of exercising a beneficial influence than the Staff College. As originally organized it was thought likely to become an institution to which the ablest men in the army would resort for the purpose of acquiring a thorough education in the higher and more complicated subjects connected with the military profession, including especially all those branches of instruction which, though not immediately connected with the routine of regimental duty, are essential to the discharge of higher duties on active service, such as field sketching and reconnaissance, fortification and artillery, military history, tactics and strategy, military administration and legislation.

Its present condition. 9089, 9196.

From the evidence, however, which we have had placed before us, by witnesses evidently untainted by any prejudice, it would appear that these expectations have not been quite fulfilled. Although it undoubtedly discharges many useful functions, the Staff College is apparently not popular with the army. It sometimes fails to attract those most likely to prove themselves most efficient when serving on the Staff. Of those who obtain admission, only a proportion appear adequately to represent the higher intellectual ability of the army; while some have been found wanting, when called upon to perform Staff duties, in certain qualifications essential to officers in such a position. 6435, 6184, 8685, 8738. 8604, 8181. 4835, 8603, 9484

Notwithstanding the discouraging representations made to us in the above sense, Your Majesty's Commissioners entertain no misgivings as to the soundness of the principle which dictated the institution of such a College, or as to the possibility of increasing its practical utility. In this opinion we are confirmed by the evidence of several witnesses, including Lieutenant-General Sir James Scarlett, who while candidly admitting the truth of the criticisms to which we have referred, maintain that even in its present state it has done much to raise the general educational tone of the army, and to distribute through the service a number of highly instructed officers. 5958 to 5982. 5130, 6027, 8197, 8683.

The chief causes which seem to deter many of Your Majesty's best officers from undertaking the Staff College course appear to be, that the fact of having obtained a Staff College certificate does not open up a sufficiently certain prospect of Staff employment to compensate for the seclusion and application implied in two years of uninterrupted study, exclusive of the severe preparation required to pass the original entrance examination; while enforced absence from their regiments, though occasionally acting as an inducement to the less zealous officers to withdraw to the College, probably proves a discouragement to those more enthusiastically devoted to their profession. The somewhat unpractical and too scientific character of a portion of the prescribed course may also contribute to its unpopularity. 1457, 6319, 9050, 9196. 5922, 6171, 6472, 9348, 9488. 5131, 9027.

Alterations proposed.

As a remedy for this unsatisfactory condition of affairs, Your Majesty's Commissioners recommend that it should be explicitly laid down that, except under certain special circumstances, no appointment on the General Staff is to be held by any but those who have passed the Staff College examination; and that in addition to all General Staff appointments, those of military secretary and assistant military secretary should, with similar exceptions, be held only by officers possessing a Staff College certificate; but

Appointments to the Staff. 6235, 9057, 9126, 9196.

that, at the same time, it should be clearly understood that this certificate should confer upon no individual any absolute personal claim to Staff employment.

As will be seen on reference to a paragraph below, the Commission have made a recommendation connected with the general instruction of the officers of the army which will entail the creation of about 60 special appointments reserved for officers who have obtained a Staff College certificate. This arrangement will considerably increase the number of prizes open to those who have passed through the College; and as subaltern officers will be eligible for a portion of these latter posts, an additional inducement will be afforded to the younger officers of the army to enter that establishment.

1578, 2347, 6433.

Modifications in the course of instruction.

The attractions of the College will, it is hoped, be still further increased by some modifications which we propose to introduce into the present course of instruction. We have endeavoured to render it more practical and less theoretical, by reducing the amount of mathematical and scientific subjects taught at the College to proportions more suitable to what is required by an officer destined for the Staff, rather than to that needed for the Engineers; by abolishing the premium attached to mathematics; and by giving to each officer a larger latitude for the cultivation of whatever subject is most congenial to his especial talents. With the latter object we also propose to put an end to the personal competition of individual candidates, and to divide the competitors into classes, instead of publishing their names in the order of individual merit.

5413, 8628, 7611, 8741, 9003, 9178.

8384, 8750, 8806, 8881.

Examination without residence.

With the view of obviating the objection felt by so many excellent officers to leaving their regiments, we recommend that a certificate qualifying the holder for the Staff should be placed within the reach of any officer who can pass the Staff College examination, even though he should not have gone through the residential course. If, however, this indulgence is permitted, every precaution must be taken to render the examination a genuine test of the candidate's equality, in all respects, with those who have passed through the prescribed course at the College. It will therefore be necessary to demand even from this latter class of candidates a residence for six weeks or two months previous to the examination, during which their proficiency in the practical branches of the instruction may be tested.

5967, 9242.

Guarantees of fitness for Staff employment.

The chief difficulty, however, consists not so much in obtaining eligible candidates for the Staff College, as in excluding those who, notwithstanding their literary acquirements, are in other respects but ill-fitted for the discharge of Staff duties. It must always be remembered that the possession of certain moral and physical qualities, such as tact, presence of mind, a military eye for country, skill and hardihood in riding, promptitude of comprehension, and readiness of speech, are as necessary to the Staff officer as high intellectual attainments, and that without these the greatest scholastic ability would be comparatively useless in emergencies in the field. This obvious fact did not escape the observation of the founders of the Staff College, and they have accordingly required of every officer presenting himself for admission a certificate from his Commanding Officer, vouching for his possession of some of the qualities referred to.

5021, 5411.

5989, 6122, 6375, 9364.

But no point has come out more clearly in evidence than the futility of this precaution. The certificates do not appear to possess more than a conventional value, granted as they are with such facility as to afford a most imperfect guarantee of the fitness of the individual.

1519, 5981, 6203, 6435, 8594, 9106, 9199.

In order to remedy this very serious evil, we recommend that the requisite certificate should proceed from the three senior officers of the candidate's regiment, should contain much more minute and searching particulars in reply to specific questions, and that the officers signing it should be impressed with the necessity of rendering it a document founded on a thorough and conscientious consideration of each individual case.

8425, 8747, 8946, 9152, 9422.

Still further to test the future Staff officer's qualifications in the practical discharge of his duties, we recommend that immediately before he goes up for his entrance examination he should be temporarily attached to the Staff of some General Officer holding a command; and that such General Officer, after having had an opportunity of estimating his qualifications, should forward a confidential report upon the subject to the Commander-in-Chief, whose sanction it will be necessary for him to obtain before presenting himself as a competitor for admission.

6168, 8504.

Instruction after leaving the College.

On leaving the Staff College the officer is, under the present system, successively attached to regiments belonging to the several arms of the service, in order to acquaint himself with the drill and interior economy of those branches to which he does not himself belong: but as he is usually sent in the winter season, when little drill is going on, we are assured that but small benefit is derived from the practice. We therefore recommend that, in place of this arrangement, such officers should be attached for three months in the following summer drill season to the Staff of a General Officer in command at one of the large camps, for the purpose of perfecting themselves in their duties as

7927, 8063, 8160, 8481.

8405, 8867.

Staff Officers, of acquainting themselves with the organization of the several arms of the service, and of acquiring some insight into the combined movements of troops.

By the adoption of the foregoing modifications, it is hoped that the Staff College will become both a more popular and a more practical institution. In this expectation, we recommend that the number of its inmates should be increased to the full extent of the accommodation it affords. At present only 30 officers are admitted, but it is capable of receiving 40 students. As we have also recommended a slight reduction in the number of the professors, as well as the abolition of the office of adjutant, no additional expense will be entailed by this increase of persons under instruction. 8539.

The Advanced Class of Artillery Officers at Woolwich may be considered as an organization in some degree analogous to the Staff College, only on a smaller scale, and for the benefit of a particular arm of the service. Many of the criticisms passed upon the one are equally applicable to the other. It does not seem to be popular, the applications for admission having at the last examination been below the number of vacancies, and at present it only comprises four officers. Its courses are spoken of as too theoretical and too scholastic; while, as in the case of the Staff College, the prospect of future advantage is not such as to induce officers to undergo the ordeal of two years of severe study and seclusion from regimental life. Artillery Advanced Class. 7998. 1639, 8217. 7983, 8079, 82

As, however, it is desirable that such officers of the Artillery as may wish to prosecute the higher branches of science connected with their profession should be afforded every facility for doing so, we are not disposed to recommend the abolition of the Advanced Class, but would suggest that the course of instruction should be modified in the sense we have indicated with regard to the Staff College; that the system of personal competition should be changed; and that its cost should be economized by incorporating into its staff of instructors some of the professors attached to the Military Academy. We also consider that the certificate obtained should not give its holder any absolute personal claim for employment. 7942.

With regard to the Royal Engineer Establishment at Chatham for the instruction of the young officers of Engineers in practical subjects connected with their profession after they have left Woolwich, we have no occasion to make any especial observation. The object of the arrangement is an excellent one, and appears to be admirably carried out. The accommodation, however, for the officers themselves is scarcely sufficient; the halls of study are very small, and both these rooms and the lecture-room are ill adapted for their purpose. We would strongly urge the remedy of these defects. Royal Engineer Establishment, Chatham. Col. Gallwey, replies.

Having shortened the period of study at the Royal Military Academy, and curtailed much of its practical character, we think it the more desirable that the recently restored system of keeping the officer of Artillery under instruction on joining his corps should be placed on a well-considered basis. Instruction of young officers of Artillery.

We are therefore of opinion that all young officers of Artillery, after leaving the Academy at Woolwich, should pass a certain time in a thoroughly systematic course of instruction in practical artillery, military law and administration, tactics, and the elements of veterinary science. 1982, 6769, 78 8075, 8201.

Although the School of Gunnery at Shoeburyness is not specially alluded to in the query under consideration, its connexion with the later instruction of officers of the Artillery is so important that our Report would be incomplete without some reference to it. We have satisfied ourselves of the thoroughly useful and practical character of the training afforded at the school. The institution of the establishment, as a central school of Artillery, appears to have been attended with the most satisfactory results. Each year upwards of 20 officers, besides non-commissioned officers, are sent out fully trained as instructors of artillery. Batteries of the Royal Artillery and squads of non-commissioned officers are also continually passing under a course of instruction for longer School of Gunnery, Shoeburyness. Col. Elwyn, replies.

or shorter periods. Considering the appliances for instruction that are provided, and the great advantage which must result from distributing through the service a large number of officers who have had such a training, we are of opinion that the utility of the establishment might be still further extended, both by increasing the number of officers annually under instruction, and by making a short course at the school a regular part of the system of instruction for all young officers of the Artillery on first entering the service.

8037.

7588.

In order to allow of this extension of the establishment, an addition to the officers' quarters would be necessary, the accommodation being barely sufficient for the present number of officers and quite unequal to provide for the proposed increase. We also recommend that the existing quarters for officers should be improved. At present they are extremely small and confined.

7866.

Artillery instruction in India.

In reference to the foregoing branch of the subject, we are especially desirous of pointing out the necessity of transferring to India the whole of the system of artillery instruction which has been established with such beneficial results at home. A very large proportion of the British army, and more than one half of the artillery corps, are permanently quartered in that country, where many officers spend at least 10 years of their life, and some of them even a longer period. Peculiar facilities exist in India for organizing such camps of instruction, and Your Majesty's Commissioners cannot express too strongly their anxiety that a comprehensive and thorough system of education, both in the practical and in the theoretical departments connected with the science of artillery, should become an essential portion of the military establishments of India.

6353.

8135.

12. *How far improvements may be effected in the present system of preparing candidates for military examinations; and further to consider and report upon such other points as may appear to them in the course of their inquiry likely to be conducive to the improvement of military education.*

On a review of the foregoing brief summary of the general scope and tendency of the recommendations of the Commission, it will be observed that so far their efforts have been directed rather to expand, to invigorate, and to systematize an organization already in existence, than to the introduction of any essential changes. On the other hand, it will not escape attention that, although by the suggestions submitted the instruction now afforded to several branches of the military service will be rendered more effectual, nothing so far has been proposed which at all reaches the great bulk of officers, viz., those attached to regiments of the Cavalry, the Guards and the Line, beyond, of course, the small annual infusion of well-educated and trained cadets who will pass out of Sandhurst. The only existing securities for the efficiency of this large and important class are the two examinations prescribed by Your Majesty's Regulations for subaltern officers. These examinations, no doubt, if properly conducted, embrace a sufficiently wide scope of subjects connected with the military profession to imply, in respect of those that pass them, a very satisfactory acquaintance with almost every subordinate subject it may be essential for a regimental officer to know. But, as has been only too explicitly brought to our notice, they are so loosely conducted, and there is such a want of uniformity between the standards of competence set up by separate Boards, that, although as far as concerns their routine duties, and the drill of their regiments, Your Majesty's officers are probably unrivalled, in many subjects connected with the more general operations of war, they are usually less instructed than those of other large armies.

Existing examinations for promotion.

4927, 5326, 5870, 6215, 6381, 6436.

5926, 6250, 6461, 6359.

Such a defect, at all times a very serious one, every day becomes more critical from the new character which operations in the field are rapidly assuming, as well as from the more delicate and complicated organization of a modern army.

Want of facilities for instruction of officers.

Duke of Cambridge, Lord Strathnairn, Sir W. Mansfield, Lord W. Paulet, Sir H. Storks, Maj.-Gen. Napier, Maj.-Gen. Carey, Col. Hort, Col. Stephenson, Col. Baker.

This absence of technical proficiency is not, we think, to be attributed to any fault of the officers themselves. There might, perhaps, be some dissatisfaction evinced against a demand for purely theoretical study; but we have been assured by witnesses of great authority that any arrangement made for providing the junior officers of the army with useful and practical instruction connected with operations in the field, in which at any moment they might find themselves called upon to engage, would be welcomed very heartily. The satisfaction which is evinced by all officers engaged in the somewhat laborious courses of instruction at Shoeburyness confirms this view. This, indeed, is only what might be expected from the high-spirited and patriotic class from which our

officers are drawn. Moved by these considerations we most earnestly recommend, as the main and most important of our conclusions, that stringent and complete effect should be given to all that part of Your Majesty's Regulations to which we have referred, and that the examinations there prescribed in field fortification and reconnaissance should not only be rendered genuine and effectual, but so amplified, as to require every officer before attaining the rank of captain, to prove himself competent, if thrown upon his own resources when in command of troops, to throw up an earthwork, to fortify the head of a bridge, to barricade a house or a barrack, to give intelligent information of the country he may have passed through, and to put down on paper a rough sketch of a post he may be called upon to occupy. 4934, 5116, 6103, 6345, 6429.

In order to promote to the utmost extent the efficiency of these regulations, we recommend not only that proper text-books should be issued by Authority, but that a staff of instructors should be created and incorporated into our military system. Such an idea is by no means novel. A scheme of garrison instruction for the whole army was suggested by Mr. Sidney Herbert in 1854; and during the course of our investigation both Garrison and Regimental Instructors have been over and over again recommended by successive witnesses. Means of instruction recommended. Letter to Lord Hardinge.

After mature consideration, we are in favour of a combination of the two principles. In consequence of the practice lately introduced of collecting into camps and garrisons large bodies of men, such a number of regiments will be located at the principal military stations as to permit the formation of classes and the institution of courses of instruction. On the other hand, as a certain proportion of Your Majesty's army will be always quartered apart, the scheme would not be complete unless to such battalions Regimental Instructors were attached, who, however, as soon as their regiments moved into a garrison would assist the garrison instructional staff. 5895, 5929, 6431, 9387. 6466, 9386.

This last element in the arrangement has more especially recommended itself to the Commission from a conviction that in the end it will be found advisable to furnish every regiment with an instructor, occupying an analogous position to that of the present musketry instructor, for whom perhaps he might be eventually substituted. It would not, however, be desirable to try the experiment on so large a scale until experience shall have shown which of the two elements of the scheme, the garrison or the regimental instruction, it would be best to develope. 5813, 6148, 643 9431, 9528.

A detailed plan of the proposed arrangement will be found appended to this Report; but its leading features may be thus briefly summarized:— Subjects of instruction and examination.

The future examinations should comprise all the subjects prescribed by Your Majesty's Regulations, and in addition certain other subjects not especially particularized, though probably intended to be comprised under the term "Field Fortification," viz.,—

The distribution of working parties when engaged in throwing up field works.

Tracing and constructing breast works and the simpler kinds of field works; making rifle pits; putting hedges, walls, bridges, and buildings in a state of defence.

Making gabions and fascines, and forming revetments.

Making and planting palisades, abattis, obstacles, &c.

Knot-tying, lashing together spars, making trestle and other temporary bridges.

Laying out encampments, constructing field ovens, &c.

Attack and defence of outposts; street fighting.

A certain amount of proficiency in field sketching and reconnaissance should also be exacted.

We recommend that the examination in these subjects should be conducted partly by sealed printed questions sent from the office of Military Education, and partly orally and practically upon the ground, by a Board of examination. This Board should consist of a Field Officer, the Commanding Engineer (or an officer deputed by him, and not under the rank of captain), and a Garrison or Regimental Instructor. 6443. 6497.

For carrying this scheme into effect about 60 Garrison and Regimental Instructors would probably be required. The additional cost thus entailed may be estimated at about 12,000*l.* per annum, a sum which would be covered by the reduction we propose to effect in the expenses of the Academy at Woolwich and the College at Sandhurst. Instructors.

The instructors should eventually be all selected from amongst officers who have passed the Staff College. A desire to qualify for these appointments will probably cause many more officers to apply for admission to that establishment. Thus a plan for giving a very elementary amount of instruction to the main body of our officers may result in a considerable proportion of them voluntarily acquiring very high technical and scientific attainments. 5821, 6649. 6433, 6497.

In addition to the obligation of passing these examinations, we think it desirable that a certain amount of attendance upon garrison or regimental instruction should be Attendance at instruction.

812, 5892, 6017, 100.

required of every subaltern officer, but the precise arrangements regulating this attendance must necessarily be determined by the Commanding Officer of the district or regiment.

It would probably be found desirable to combine so much of the instruction of officers as is of a practical nature, such as the construction of field works, &c., with instruction in the same subjects to the rank and file of the army.

Should this scheme for the instruction of officers of the Cavalry, Guards, and Line be found fully to answer our expectations, it may become at some future time a question whether the Cadet College at Sandhurst might not with advantage be abolished, and the Exchequer relieved of the annual sum now voted for its maintenance, due provision being made elsewhere for the education of the sons of poor and meritorious officers.

The same system recommended for India.

6353, 6471, 9281.

We have already pointed out the necessity of transplanting to India the system of artillery instruction which has been productive of so many beneficial results at home. The same considerations apply with equal force to the introduction into that country of the foregoing scheme of garrison and regimental instruction for the Line. Nearly one half of Your Majesty's Infantry regiments are stationed for 10 or 12 years consecutively in India. Though paid from Indian revenues, the troops in that country are part and parcel of the British army, and it is very evident that any regulations of the kind we have suggested would be useless unless universally applied. To deprive Your Majesty's officers serving in India of the educational advantages provided for their brother officers at home, would be most unjust to them and injurious to the service at large. It would be manifestly impossible to enforce the system of examinations we recommend with equal strictness in India, if the method of instruction for the regiments in that country is not identical with that adopted elsewhere; and unless these examinations are everywhere carried out on uniform principles and with the same stringency, we feel that the advantages to be anticipated from their introduction will be nullified.

Concluding remarks.

Duke of Cambridge, 5358 to 5360.

In concluding this First Report, Your Majesty's Commissioners desire especially to observe that, taking into account the character of the English people, the peculiar system of purchase which regulates promotion, and the social characteristics of the class from which our army is officered, they do not consider that the rigid uniformity of the instructional system which prevails in some continental armies could be introduced into this country. On the contrary, by developing what exists, by harmonizing its component parts, and by bringing them into intimate connexion with each other, we think our military educational system will assume a flexibility and variety of type far more likely to produce good practical results. In the officers of the army Your Majesty already possesses a body of gentlemen of the highest spirit and inspired by the most devoted sense of duty. Eminently endowed, as they are, with natural aptitudes which go so far to constitute the excellence of the military character, we have perfect confidence that when once the requisite facilities are afforded them of superadding technical knowledge to their other qualifications, they will carry the perfection of military training to a point which has never yet been exceeded in any army in the world.

DUFFERIN AND CLANDEBOYE.
EUSTACE CECIL.
NORTHBROOK.
CHARLES RUSSELL.
D. A. CAMERON, Lieut.-General.
H. MONTAGU BUTLER.
W. C. LAKE.
F. EARDLEY-WILMOT, Major-General.
E. HAYTHORNE, Major-General.
C. S. PARKER.
CHARLES C. CHESNEY, Lieut.-Col., R.E.

JOHN W. HOZIER, Captain, 2nd Dragoons,
Secretary.

August 9th, 1869.

DISSENT BY GENERAL LORD DE ROS FROM SOME OF THE RECOMMENDATIONS CONTAINED IN THE REPORT.

Although I should much have wished to concur in all the material points of the Commissioners' Report, there are some important matters on which I must with reluctance record my dissent.

1st. Every possible attempt has been made, by evidence tendered to this Commission, to represent the results of the Staff College as successful; yet a strong opinion prevails in military circles, in which I fully agree, that no such institution is required for the army; and certainly Sir W. Mansfield is but echoing that opinion when he writes (with the authority of ability as well as of experience), "We find when a campaign takes "place, and when considerable casualties have occurred in the conduct of a war, that the "military commanders in their several degrees, and the administrative departments are able "to lay their hands on officers in the regiments who, *without previous training*, are fairly "competent at once to undertake the performance of military and civil staff duties, some "of the former involving considerable scientific attainments. It is not too much to say "that the careers of a majority of the men who have been distinguished in the army, "whether in India or in Europe, have commenced from their being taken for staff "appointment at such periods of stress and difficulty." He goes on to say:—"Of the "administrative and technical ability to be found among the regimental officers we have "another proof in the fact, that Government reverts to the regiments whenever it has "occasion suddenly to organize or develope establishments, *e.g.*, the measures of relief "during the Irish famine, and the demands made on regiments to furnish officers for "different kinds of employment in India and the Colonies." Field Marshal Sir J. Burgoyne, an officer of European celebrity for scientific attainments, and who, moreover, has seen more service in the field than any British officer now living, writes in a similar strain. He says:—"I deny that the Staff has hitherto shown itself inferior to any other "in the world, or that individuals competent for it are not always available from the regi-"mental officers of the army. Among the mass of the army there will always be found "officers qualified for the Staff, and it would be most injudicious to follow the practice "of some foreign armies in having a corps peculiarly for the Staff. You may by that "means secure officers with a given amount of scientific qualifications, but they may be "wanting in what is of far more consequence. By selection from the bulk of the army "you will find the necessary qualifications, and a stimulus is thus given for the study and "prosecution of knowledge among the officers generally." Such are the views of Sir J. Burgoyne and Sir William Mansfield. His Royal Highness the Commander-in-Chief, when asked the direct question, whether he had ever known any case of a good regimental officer breaking down as a Staff officer, replied emphatically, "Never."

On the other hand, I cannot but observe that only one General Officer (Sir James Scarlett) *who has held any important command on foreign service* has given any strong opinion in favour of the Staff College; while so many have given their testimony against it, that the Commissioners themselves report "that it is apparently not popular with the "army; that it sometimes fails to attract those most likely to prove themselves most "efficient when serving on the Staff, and that of those who obtain admission only a pro-"portion appear adequately to represent the higher intellectual ability of the army; "while some have been found wanting, when called upon to perform Staff duties, in "certain qualifications most essential to officers in such a position." These are strong expressions, but even stronger would be warranted by the evidence, although Commandants, Professors, and Instructors, recently or at present connected with the Staff College, have appeared before the Commission to give evidence, and naturally enough, in many instances, to plead and advocate the cause of an institution of which they had been, or still continued to be, members.

2nd. It is proposed to institute *Regimental Instructors*. Now the very term "instructor" implies considerable superiority of acquirements, and should carry with it the weight and influence which usually accompanies that superiority. But how is it possible for a captain, or senior subaltern, appointed as "Regimental Instructor" to hold in his own regiment the anomalous position of a schoolmaster to those with whom he is living in the familiarity of a regimental mess? By the advocates of this experimental

novelty it has been argued, that "Regimental Instructors" will have as much authority as adjutants; but surely authority is not the only requirement for officers who are to instruct others, of very nearly the same age and rank as themselves. The drill instruction imparted by an adjutant is of a totally different nature from the more intellectual and mental teaching which it is proposed to impart through "Regimental Instructors." The English subaltern has generally seen a little of the world when he joins; and a few years of regimental life frequently make him a pretty acute observer, and perhaps dispose him, as he gains a knowledge of his profession, to indulge in occasional criticism on military subjects and persons. The friendly sort of brotherhood in which the subalterns of a good regiment are commonly united, does not tend to check or restrict this disposition; and whatever talent and tact the proposed instructing captain or lieutenant may possess, he must either keep himself somewhat aloof from his comrades, or he must be prepared to encounter the sneers and jokes of those who, thinking they know as much as he, will not be inclined to spare him, when they catch him blundering, or at fault, in his instructions. The Commission propose to avoid this difficulty in some measure by supplying "Regimental Instructors" from the Staff College, if good ones are not forthcoming in the regiments; but have they not admitted that of the Staff Collegians "only a proportion appear adequately "to represent the higher intellectual ability of the army?" It is true that, as a condition of retaining the Staff College, the Commission propose to *improve* it. Possibly their suggestions may somewhat *amend* it, but what guarantee have we that they will so far succeed as to make it a nursery for good "Regimental Instructors?" To the Commissioners' scheme of *Garrison Instructors* at large stations and camps for training officers in field fortification, reconnaissances, posting of picquets, &c., I entirely subscribe; and the more readily, as I believe such Instructors might effectually fulfil and carry out a valuable system of military instruction, which the Staff College (wandering into a sort of fool's paradise of abstract learning and science) has hitherto failed to accomplish.

3rd. Of all the matters considered most carefully and with most unanimous anxiety by the Commission, none has been more thoroughly sifted than the pernicious system of what is called *cramming*. We have satisfied ourselves that such a road to knowledge is beset with evils; and that false and superficial notions are acquired, instead of sound and durable knowledge. In many instances both the health and morals of the students have suffered; the former from overwork (especially in mathematics), and the latter from a laxity of supervision, and the absence at the "crammer's" of that example which is such a valuable ingredient in Public School training. We have had evidence of youths being required to apply closely to mathematics for eight hours of the day; and one of the reasons assigned for irregularities at Sandhurst was the bad tone and example of cadets who had come from the "crammers'" academies. Unfortunately the chief and obvious support of the "cramners" is the adoption of what is called "open competition" at our military examinations. The Commission propose to lessen this evil by a more frequent change of the examiners, so as to prevent the "crammers" from forming (as they certainly do at present) a pretty accurate judgment of the line of questions likely to be propounded, and specially preparing their pupils for those chances, instead of relying on sound instruction. This may mitigate, but it will not cure the mischief, which I believe to be inherent in all purely competitive tests of examination; and here again I have the high authority of F. M. Sir John Burgoyne. He writes:—"Competitive examination gives rise to a system "of 'cramming' and defeats its own end of encouraging the attainment of knowledge. "Besides being a hardship to the individual, it may lose to the public many valuable "candidates for commissions. A competitive examination to fill up a certain number "of vacancies may lead to great injustice, for the candidate may be rejected when in "competition with one set, who might come out as No. 1 in another." On these grounds I hold a strong opinion that both for Sandhurst and Woolwich the entrance should be by a well regulated combination of nomination and qualification, and not by the system of open competition.

DE ROS,
General.

APPENDIX.

THE following Appendix contains a detailed Statement of the Recommendations made in the Report for the Re-organization and Expansion of the existing System of Military Education.

I.—GENERAL SUPERINTENDENCE OF MILITARY EDUCATION.

Substitutio of a single authority for the Council.

It is considered that it would be of advantage if the duties which at present devolve upon the Council of Military Education were concentrated in a single authority, acting under, and directly responsible to, the Secretary of State for War, with the title of Director-General of Military Education. This officer should be assisted by such a staff as circumstances may require.

Transferer of general examinations to Ci Service Co missioners

It is recommended that the examinations into which no military subjects enter, and which are merely intended to test the general knowledge of the candidates, namely the entrance examinations to Sandhurst and Woolwich and the examination for admission to the army by Direct Commissions, should be conducted under the superintendence of the Civil Service Commissioners.

Professiou examinations.

The professional examinations, such as those at the various places of military education, the examination for the post of aide-de-camp, and the special examination which it is proposed to institute in connection with the system for the instruction of officers after entering the service, should be placed under the control of the Director-General of Military Education. It is not, however, proposed to alter the present arrangements with regard to the supervision of the existing examinations for the promotion of subaltern officers.

Appointme of examine

With respect to the mode of conducting the examinations, it is considered important that there should be a general uniformity in their character, so that the candidates on different occasions may be tried as far as possible by the same standard. At the same time, it is advisable that the questions set should not run entirely in the same groove. For these reasons it appears desirable that an element of permanence should be combined with a certain amount of change in the bodies by whom the examinations are conducted. It is therefore recommended that no individual examiner should retain his appointment for more than four years, but that, on the other hand, the whole body of examiners conducting any one of the various examinations should never be changed at the same time.

II.—SCHEME FOR THE RECONSTRUCTION OF THE ROYAL MILITARY COLLEGE, SANDHURST.

SECTION I.

SECTION

OBJECT OF THE COLLEGE.

Object of the Colleg

The Royal Military College should be maintained in future on such a limited scale as to provide only for the special military education of cadets who are to enter the cavalry or infantry with free commissions.

SECTION II.

SECTION I

REGULATIONS FOR ADMISSION, &c.

Strength o the Colleg

The average number of free commissions given annually to Sandhurst during the last six years, including those given to Queen's and Indian Cadets, has been nearly 100. Supposing, therefore, a two years' residence to be the regular course, and allowing a small margin for casualties, it appears that the strength of the future College may be fixed at about 210 cadets.

Conditions of admissio

The following are proposed as the conditions for entrance:

The limits of age for admission to be from 16 to 17, with no exception.

Admission to be determined by open competition, unaccompanied by nomination, with proper guarantees as to the moral and physical fitness of the candidate.

Qualifying examination.

Every candidate should be required to pass a qualifying examination in the following subjects, whether he takes them up among those in which he wishes to compete, or not:

(1.) Mathematics, viz.,
  (*a.*) *Arithmetic.*
  (*b.*) *Algebra*, to simple equations.
  (*c.*) *Geometry*, not beyond the standard of the first book of Euclid.
(2.) French or German.
(3.) English writing from dictation.
(4.) Free-hand (figure and landscape) drawing.

The qualification required in these subjects should not exceed the following:—In mathematics, one-third of the total number of marks allotted to the paper; in French (or German), one-fourth; in drawing, one-fourth, with an easy copy.

The marks gained in any subject of the qualifying examination should not be counted for competition except when the candidate takes up that subject as one of those in which he wishes to compete.

Competitive examination.

The subjects of the competitive examination should be as follows:

(1.) Mathematics, including the subjects of the qualifying examination, together with more advanced geometry and algebra, and plane trigonometry.

{ (2.) English composition (tested by the power of writing an essay, letter, or précis), *or* and English literature, limited to specified authors.
(2*a*.) English composition as above, and English history, the examination in the latter subject being limited to certain fixed periods notified beforehand.

N.B.—Subjects (2.) and (2*a*.) are regarded as alternative; a candidate should not be allowed to take up both.

(3.) Latin.
(4.) Greek.
(5.) French; the examination to be partly colloquial.
(6.) German; the examination to be partly colloquial.
(7.) Experimental sciences, limited to one of the two following branches, viz. (1.) chemistry, including heat; or (2.) electricity and magnetism.
(8.) Free-hand (figure and landscape) drawing.

Proportion of marks.

Marks for these subjects should be given in the following proportions:

(1.) Mathematics (including 1,000 allotted to the subjects of the qualifying examination.)	4,000
{ (2.) English composition and literature *or*	1,500
(2*a*.) English composition and history	1,500
(3.) Latin	3,000
(4.) Greek	2,000
(5.) French	2,000
(6.) German	2,000
(7.) Experimental sciences	1,500
(8.) Free-hand drawing	1,000

Of these eight subjects a candidate should not be allowed to take up more than five for competition, or six if free-hand drawing be one of them.

A minimum of one-fifth of the total number of marks should be fixed in each subject, and this minimum should be deducted from all marks gained by a candidate.

Section III.

Section III.

Terms of Payment.

Payments.

The payments required from the cadets should be on the following graduated scale:*

* The changes proposed relate only to the first two classes of cadets. The present scale in these cases is as follows:

Sons of private gentlemen	100*l.*
Sons of admirals, and of general officers having regiments or receiving Indian colonels' allowances	80*l.*
Sons of general officers without regiments	70*l.*

The payments from the other classes are left unaltered.

	Per annum. £
Sons of private gentlemen, and of general officers having regiments or receiving Indian colonels' allowances	110
Sons of general officers without regiments, and of admirals	70
Sons of captains and commanders of the Royal Navy, and of field officers of the Army having substantive rank	50
Sons of all officers of the Royal Navy and Army under the above rank	40
Sons of officers of the Royal Navy and Army who have died in the service, and whose families are proved to be left in pecuniary distress	20
Queen's and Indian cadets	Free.
Sons of professors at the Staff and Cadet Colleges and at the Royal Military Academy	50
Sons of instructors at the above establishments	40

Queen's and Indian cadets should be admitted to and passed through the College only under the same conditions (except as regards payments) as other cadets. Queen's and Indian Cadets.

Section IV.

Section IV

Government and Organization.

An independent inspection by a Board of Visitors, appointed by the Secretary of State, and reporting to him, should be made at least once a year. Such Visitors should not be a permanent body, but, on the other hand, should not all be changed at the same time. The report of the Board should be presented to Parliament. Independent inspection.

The present Board of Commissioners should cease to have any connexion with the discipline or instruction of the College.

The College should be under the control of a Governor, a military man, selected with special reference to his qualifications for superintending both instruction and discipline, and appointed by and responsible to the Secretary of State for War. Governor.

The Governor should take part in the instruction of the cadets.

The Governor, with the approval of the Secretary of State, should have the power of appointing and removing the professors and instructors.

The organization should be arranged as follows: Principles of organization.

The Governor should be solely responsible for discipline and for the general superintendence of the studies.

He should be assisted in the arrangement of the studies by a College Board, composed of the professors or senior instructors of the different branches. The head of each branch should have the general power of supervision and inspection over the studies in that department, with the duty of reporting on them to the Governor.

The Governor should from time to time assemble and confer with all the instructors of each separate branch on matters relating to it.

He should also, from time to time, during each half year, call together the whole body of the instructors, and take their opinion on matters connected with the general interest of the College.

The cadets, instead of forming, as at present, a battalion composed of companies, should be distributed in Divisions, each containing not more than about 25 students. Discipline and supervision.

Every Division should be under the personal charge of one of the professors or instructors selected by the Governor, to whom he should be responsible for the personal supervision of each cadet, and for conducting ordinary correspondence with the friends of the cadets.

The professors and instructors should be either military men or civilians, as the appointing power may judge best. The languages should be taught, if possible, by Englishmen. Instructors.

The professors and instructors should have certain limited powers of punishment, within and without the halls of study, at the discretion of the Governor, to whom they should report all punishments which they may have inflicted.

The Chaplain should be specially appointed by the Secretary of State, and should not be necessarily a military chaplain. Chaplain.

The examinations should be entirely conducted by examiners independent of the College. Conduct of examinations.

It is considered, as will appear by Sect. VI., that the present staff may be reduced, but that some of the salaries should be increased. An additional allowance should be made Reduction of staff.

to the instructor in charge of a Division in consideration of the responsibility attached to the post.

Private teaching. The professors and instructors should be permitted to give private lessons, with the sanction of the Governor; but resident pupils should be absolutely forbidden.

Rank and tenure of office of Governor. The Governor by virtue of his office should have local rank superior to that of any of the officers employed under him.

The appointment should be for seven years with power of re-appointment, but in all cases should terminate after 14 years, or at the age of 60.

Tenure of appointments by instructors and other officials. The professors and instructors, if military men, should be appointed for seven years at least, with the power of re-appointment. If civilians, their tenure of office should in no case continue after the age of 55, unless an extension be specially recommended by the Governor and approved of by the Secretary of State.

Section V.

Section V.

Minor Regulations, &c.

Powers of Governor. The Governor should have the absolute power of rustication. The power of dismissal should be subject to the approval of the Secretary of State.

Punishments. The punishments should be of a less exclusively military character than at present. No kind of drill should under any circumstances be awarded as a punishment.

Employment of senior cadets. A certain number of the senior cadets in each Division should be charged with part of the control and superintendence, with slight, but independent, powers of punishment and special privileges.

During the studies the professors and instructors should be solely responsible for order, and should have proper powers of enforcing it.

Probationary examinations. There should be an examination, conducted by examiners independent of the College, at least once a term. If any cadet should fail to come up to the required standard at two successive examinations, he should be removed.

Good conduct marks. Good conduct should be an element in placing the cadets in the final examination. It is recommended that a single special reward for excellence in conduct should be given at each final examination.

Section VI.

Section VI.

Course of Instruction, Establishment, &c.

Length of course. The length of the course of instruction should be increased to two years.

Subjects of obligatory instruction. The following subjects should form the course of obligatory studies:

(1.) Mathematics; including geometry, algebra to quadratic equations, and plane trigonometry.
(2.) Field fortification and elements of permanent fortification.
(3.) Military drawing and field sketching, including reconnaissance.
(4.) Military history and geography.
(5.) Military accounts and correspondence.
(6.) French or German, at the student's choice.
(7.) Elementary physics.

Of these subjects, mathematics should be dropped after the first year, or as soon as a cadet has satisfied the College authorities that he is adequately acquainted with the subject; the language might also probably be dropped in the last year.

Voluntary subjects. In addition to the obligatory course, every cadet should be allowed, at his option, to take up for the examinations certain voluntary subjects. These subjects should be as follows:

(1.) Higher mathematics, instruction being afforded by the mathematical instructors.
(2.) Latin. } Instruction in these subjects being given by the Chaplain.
(3.) Greek. }
(4.) A second modern language.
(5.) Free-hand (figure and landscape) drawing (an instructor being provided by the College for this study).
(6.) English literature and history.*

A cadet should not be allowed to take up more than two of these voluntary subjects, nor should he be permitted to change the subjects he has selected at a later period than immediately after the first examination in them.

* It is not proposed that any instruction in these subjects should be given at the College.

It is considered that 30 hours per week of study under the instructors, with the addition of an hour a day for private study, should suffice amply for the obligatory course, on some such division of studies as the following: Number o hours' stu

	1st Term.	2nd Term.	3rd Term.	4th Term.
	Hours.	Hours.	Hours.	Hours.
Mathematics	12	9	—	—
Fortification	6	6	9	9
Military drawing, &c.	6	6	9	9
Military history and geography	—	3	6	6
French or German	6	6	—	—
Physics	—	—	4	4
Military accounts and correspondence	—	—	2	2
Private study	6	6	6	6
	36	36	36	36

Drill, Riding, and Gymnastics { Besides, for such hours as the Governor may find necessary.

For the proposed establishment, with such a table of studies as the above, the following staff of instructors should be sufficient, viz.: Number o instructor

	No. of Instructors.	
For Mathematics	3	One of these to give lectures on Physics, with additional pay of £80 a year.
„ Fortification	3	—
„ Military drawing, &c.	5	At 4½ hours daily.
„ Military history	2	—
„ French and German	2	Both languages to be taught by each instructor.
„ Physics	0	To be taught by one of the mathematical instructors.
„ Military accounts, correspondence, and drill	2	Drill to be conducted by the instructors in military accounts and correspondence.
„ Figure and landscape drawing	1	—
Total number of Instructors	18	

In addition the College would probably require the following staff:

Paymaster and Quartermaster (combined)	1
Medical Officer	1
Riding Master	1
Chaplain	1

This would make an establishment of 23* individuals, including the Governor.

The scale of salaries proposed for the above staff is as follows: Pay of st

	Yearly.	Maximum annual expense of staff.
	£	£
Governor	1,500	1,500
1 professor of mathematics	450 to 550	550
	By a triennial increase of 50*l.*	
2 instructors in mathematics	300 to 400	800
	By a triennial increase of 50*l.*	
Additional payment to the mathematical instructor who teaches physics	80	80
1 professor of fortification	450	450
1 professor of military history	450	450

* The present establishment consists of 45, including two professors who are also employed at the Staff College.

	Yearly.	Maximum annual expense of staff.
	£	£
1 professor of military drawing	450	450
2 instructors in fortification	350	700
1 instructor in military history	350	350
4 instructors in military drawing	350	1,400
Senior instructor in French and German	350	350
Junior instructor in French and German	300	300
Senior instructor in military accounts, correspondence, and drill	350	350
Junior instructor in military accounts, correspondence, and drill	300	300
1 instructor in figure and landscape drawing	350	350
1 Chaplain and classical instructor	450	450
1 paymaster and quartermaster	Salaries to be fixed by the War Office Regulations.	
1 surgeon		
1 riding master		
Additional allowance to eight instructors in charge of divisions, each	£ 75	£ 600
Total maximum annual amount of salaries of staff, exclusive of paymaster, surgeon, and riding master		9,430
Present annual expense of military and educational staff (including half-pay and allowances), also exclusive of paymaster, surgeon, and riding master, as extracted from the estimates for 1869–70		16,565
Estimated saving annually		£7,135

The above salaries should be considered as consolidated rates, including all pay and allowances of every kind, with the exception of the allowance of 50*l.* a year for the members of the staff not provided with quarters, and of the Governor's pay as colonel of a regiment, in the event of his holding such an appointment.

Assistant to the Governor.

The senior drill instructor should act as assistant to the Governor in conducting the correspondence of the College. This officer, however, should have no control over the professors or other members of the staff.

Religious instruction.

Religious instruction should be regularly imparted to the cadets by the Chaplain by means of lectures, and by voluntary classes on Sundays.

Instruction in classics.

The Chaplain should be also required to give instruction in Latin and Greek by lectures to voluntary classes.

Instruction in drill.

A limited amount only of drill should be taught, but great care should be taken that it is taught thoroughly. Not more than an hour a day should be devoted to the purposes of drill.

Artillery drill to a moderate extent might be combined with the fortification course.

There should be as few parades as possible for non-military purposes.

Riding, &c.

Riding, gymnastics, fencing, and swimming should form part of the ordinary course of instruction.

Excellence in riding, in gymnastics, in fencing, and in swimming, should be encouraged by prizes.

Marks for subjects.

Marks should be assigned to the subjects of instruction in the following proportions:

(1) Obligatory.

Mathematics to trigonometry	6
Fortification	8
Military drawing and reconnaissance	8
Military history, &c.	6
Military accounts, &c.	3
Modern language	6
Physics	3
Total	40

(2) Voluntary.

Higher mathematics.	Each 3.
Latin.	
Greek.	
A second modern language.	
Figure and landscape drawing.	
English literature and history.	

No cadet should be ensured a free commission unless he qualify by obtaining at least one-fourth of the marks in each of the seven obligatory subjects, and one-half of the total aggregate of the marks allotted to these subjects. Qualification in obligatory subjects.

No voluntary subject should gain a cadet any marks unless he obtain more than a minimum of at least one-third in it. The marks gained in the voluntary subjects should be added to those obtained in the obligatory subjects, to make a second total according to which the cadets should be finally placed. Minimum for voluntary subjects.

The whole of the marks allotted to each subject should be reserved for the examinations conducted entirely by examiners independent of the College at the close of each term. The special examination in obligatory mathematics should take place at the end of the first or second term (the marks being registered); the examinations in the other obligatory subjects and in the two voluntary subjects should take place at the end of each term in which they are studied, a certain proportion of the marks gained in each examination being carried forward to the final examination. Conduct of the examinations.

It is recommended that the advantages offered to those who successfully pass through the College should be as follows: Advantages offered by the College

(1.) Every cadet who passes the final examination should be entitled to a commission without purchase.

(2.) The certificate of having passed this examination should carry with it exemption (except in regard to the subject of military law) from the Special Army examination which it is proposed should be passed by all other officers within two years after entering the service.

(3.) A certificate of having passed with distinction a special examination at the College in certain subjects, such as modern languages, military drawing and reconnaissance, military correspondence, and field fortification, should qualify a cadet for the appointment of aide-de-camp without further examination after entering the service.

It is hoped that, although all who successfully pass the final examination will obtain free commissions, sufficient stimulus to competition at the College may be afforded by the different value of the prizes offered, viz.: Stimulus to competition.

(1.) Commissions in ordinary purchase regiments of the cavalry or infantry.

(2.) Commissions in the non-purchase line regiments.

(3.) Commissions in colonial corps.

Section VII. Section V

Accommodation.

In the event of the foregoing recommendations being adopted, it is recommended that the buildings should be prepared at as early a date as possible for the new system, and that separate accommodation should be provided for each cadet. Whilst doing this, it would be desirable to assign a quarter for an unmarried officer to each two Divisions of students. Four quarters for married officers should be in immediate proximity to the buildings occupied by the students. These arrangements might be begun as soon as a cessation of entrances causes a reduction in the number of cadets at the College. Accommodation.

It is recommended that workshops, similar to those existing at Woolwich Academy, should be established for the use of the cadets at Sandhurst.

III.—SCHEME FOR THE RECONSTRUCTION OF THE ROYAL MILITARY ACADEMY, WOOLWICH.

Section I. Section

Object of the Academy.

The Royal Military Academy should be maintained for the purpose of affording a preparatory education to candidates for the Artillery and Engineers; this education should be chiefly technical, and should in no obligatory subject be carried beyond the points useful to both corps alike. Object.

Section II.

Section II.

Regulations for Admission, &c.

Strength of the Academy.

The number of cadets should be about 200, but must necessarily vary according to the requirements of the service.

Conditions of admission.

Admission should be determined as at present by competition, unaccompanied by nomination, with proper guarantees as to the moral and physical fitness of the candidates.

The limits of age for admission should be from 16 to 18.

The number of trials allowed should not exceed three.

Qualifying examination.

Every candidate should be required to pass a qualifying examination in the following subjects, whether he takes them up among those in which he wishes to compete, or not:

(1.) Mathematics, including arithmetic, algebra, and geometry as far as the sixth book of Euclid.
(2.) French or German.
(3.) English writing from dictation.
(4.) Geometrical drawing.

The qualification required in these subjects should not exceed the following:—in mathematics, one-fourth of the total number of marks allotted to the paper; in French (or German), one-fourth; in geometrical drawing, the candidate should satisfy the examiner (as at present) that he is fairly acquainted with the use of the ordinary mathematical instruments.

The marks gained in any subject of the qualifying examination should not be counted for competition except when the candidate takes up that subject as one of those in which he wishes to compete.

Competitive examination.

The subjects of the competitive examination should be as follows:

(1.) Mathematics, including the subjects of the qualifying examination, together with plane trigonometry, mechanics, hydrostatics, spherical trigonometry, and differential and integral calculus.
(2.) English composition (tested by the power of writing an essay, letter, or précis), *or* and English literature, limited to specified authors.
(2*a*.) English composition as above, and English history, the examination in the latter subject being limited to certain fixed periods notified beforehand.

N.B.—Subjects (2.) and (2*a*.) are regarded as alternative; a candidate should not be allowed to take up both.

(3.) Latin.
(4.) Greek.
(5.) French; the examination to be partly colloquial.
(6.) German; the examination to be partly colloquial.
(7.) Experimental sciences, limited to one of the two following branches, viz. (1) chemistry, including heat; or (2) electricity and magnetism.
(8.) Free-hand (figure and landscape) drawing.

Proportion of marks.

Marks for these subjects should be given in the following proportions:

(1.) Mathematics (including 1,000 allotted to the subjects of the qualifying examination).	4,000
(2.) English composition and literature *or*	1,500
(2*a*.) English composition and history	1,500
(3.) Latin	3,000
(4.) Greek	2,000
(5.) French	2,000
(6.) German	2,000
(7.) Experimental sciences	1,500
(8.) Free-hand drawing	1,000

Of these eight subjects a candidate should not be allowed to take up more than five for competition, or six if free-hand drawing be one of them.

A minimum of one-fifth of the total number of marks should be fixed in each subject, and this minimum should be deducted from all marks gained by a candidate.

Section III.

Section III.

Terms of Payment.

Payments.

The payments required from the cadets should be on the same graduated scale as that proposed for Sandhurst, viz.:

Proposed Scale.	Per Annum. £	Present Scale.	Per Annum £
Sons of private gentlemen, and of general officers having regiments or receiving Indian colonels' allowances	110	Sons of private gentlemen	125
		Sons of admirals, and generals having regiments	80
Sons of general officers without regiments, and of admirals	70	Sons of generals without regiments	70
Sons of captains and commanders of the Royal Navy, and of field officers of the Army having substantive rank	50		60
Sons of all officers of the Royal Navy and Army under the above rank	40		40
Sons of officers of the Royal Navy and Army who have died in the service, and whose families are proved to be left in pecuniary distress	20		20
Sons of professors at the Staff and Cadet Colleges and at the Royal Military Academy	50		60
Sons of instructors at the above establishments	40		40

Section IV.

Section IV

Government and Organization.

An independent inspection by a Board of Visitors, appointed by the Secretary of State, and reporting to him, should be made at least once a year. Such Visitors should not be a permanent body, but, on the other hand, should not all be changed at the same time. The report of the Board should be presented to Parliament. Independe inspection.

The Academy should be under the control of a Governor, a military man, selected with special reference to his qualifications for superintending both instruction and discipline, and appointed by and responsible to the Secretary of State for War. Governor.

The Governor should take part in the instruction of the cadets.

The Governor, with the approval of the Secretary of State, should have the power of appointing and removing the professors and instructors.

The organization should be on a military basis.

The Governor should be solely responsible for discipline and for the general superintendence of the studies. Principles organizati

He should be assisted in the arrangement of the studies by an Academy Board, composed of the professors or senior instructors of the different branches. The head of each branch should have the general power of supervision and inspection over the studies in that department, with the duty of reporting on them to the Governor.

The Governor should from time to time assemble and confer with all the instructors of each separate branch on matters relating to it.

He should also, from time to time, during each half year, call together the whole body of the instructors, and take their opinion on matters connected with the general interest of the Academy.

*Alternative schemes for the distribution and superintendence of the cadets.**

[The cadets should be distributed in Divisions, each containing not more than about 25 students.

Every Division should be under the personal charge of one of the professors or instructors selected by the Governor, to whom he should be responsible for the personal supervision of each cadet, and for conducting ordinary correspondence with the friends of the cadets.]

[The Governor should be assisted, as regards the studies, by an officer of some standing entirely subordinate to him, and having no independent control over the professors and instructors. Discipline and supervision.

The cadets should form one company under a captain, assisted by two or three lieutenants, charged with the discipline out of studies and the drill.

The captain, if found advisable, might also discharge the duties of paymaster.]

* The members of the Commission were equally divided in opinion on the question whether the organization of the Academy should in this respect be assimilated to that recommended for Sandhurst. The alternative propositions discussed are therefore both stated.

The professors and instructors should be either military men or civilians, as the appointing power may judge best. The languages should be taught, if possible, by Englishmen.

The professors and instructors should have certain limited powers of punishment within and without the halls of study, at the discretion of the Governor, to whom they should report all punishments which they may have inflicted.

The Chaplain should be specially appointed by the Secretary of State, and should not be necessarily a military chaplain.

The examinations should be entirely conducted by examiners independent of the Academy.

It is considered, as will appear by Sect. VI., that the present staff may be reduced, but that some of the salaries should be increased. An additional allowance should be made to the instructor in charge of a Division in consideration of the responsibility attached to the post, if the distribution of the cadets in Divisions be adopted.*

The professors and instructors should be permitted to give private lessons, with the sanction of the Governor, to Academy students; but other pupils should be absolutely forbidden.

The Governor by virtue of his office should have local rank superior to that of any of the officers employed under him.

The appointment should be for seven years with power of re-appointment, but in all cases should terminate after 14 years, or at the age of 60.

The professors, instructors, and other officials, if military men, should be appointed for seven years at least, with the power of re-appointment.

If civilians, their tenure of office should in no case continue after the age of 55, unless an extension be specially recommended by the Governor and approved of by the Secretary of State.

Section V.

Minor Regulations.

The Governor should have the absolute power of rustication. The power of dismissal should be subject to the approval of the Secretary of State.

The punishments should be of a less exclusively military character than at present. No kind of drill should under any circumstances be awarded as a punishment.

A certain number of the senior cadets should be charged with part of the control and superintendence, with slight, but independent, powers of punishment and special privileges.

During the studies the professors and instructors should be solely responsible for order, and should have proper powers of enforcing it.

There should be an examination, conducted by examiners independent of the Academy, at least once a term.

If any cadet should fail to come up to the required standard at two successive examinations, he should be removed.

Good conduct should be an element in placing the cadets in the final examination. It is recommended that a single special reward for excellence in conduct should be given at each final examination.

Section VI.

Course of Instruction, Establishment, &c.

The length of the course of instruction should be reduced to two years.

The following subjects should form the course of obligatory studies:

(1.) Mathematics, for the first term or year only, including a thorough knowledge of plane trigonometry, but not going beyond this subject.

(2.) Fortification, field and permanent; the course should be limited to such instruction in the subject as is requisite for the Artillery; the present amount of merely mechanical drawing should be diminished, but the geometrical drawing strictly necessary should be included in the course.

(3.) Artillery; to be confined to such a moderate course as is suitable to cadets qualifying for the Engineers.

(4.) Military drawing, not to be carried beyond field sketching and reconnaissance.

(5.) Military history and geography.

(6.) Practical mechanics, with the application of mathematics to machinery.

* See note on preceding page.

In addition to the obligatory course, every cadet should be allowed, at his option, to take up for the examinations certain voluntary subjects. Voluntary subjects.

These subjects should be as follows:

(1.) The higher mathematics.
(2.) The higher portions of fortification.
(3.) French.
(4.) German.
(5.) Free-hand (figure and landscape) drawing.
(6.) Chemistry.

} Instructors in these subjects being provided.

(7.) Latin.
(8.) Greek.

} Instruction in these subjects being given by the Chaplain.

A cadet should not be allowed to take up more than three of these voluntary subjects, nor should he be permitted to change the subjects he has selected at a later period than immediately after the first examination in them.

It is considered that five hours a day on an average should be devoted in the halls of study to the obligatory subjects, and that this need not be exceeded; to this should be added at least one hour a day for private study. Number of hours' study

Drill, riding, and gymnastics should be carried on at such hours as the Governor may find necessary.

For the proposed establishment the following staff of instructors, besides those for drill, should be sufficient: Number of instructors

Mathematics	4
Fortification and geometrical drawing	4
Artillery	2
Military drawing, &c.	5
Military history and geography	1
Mechanics (to be provided for in the mathematical instruction).	
French and German (combined)	2
Figure and landscape drawing	1
Chemistry (a lecturer giving one or two lectures a week)	1
Classics; instruction to be given by the Chaplain.	

In addition the Academy would require:

either		or	
Drill instructors*	2	Inspector of studies*	1
Paymaster and quartermaster (combined)	1	Company officers*	3 or 4
Medical officer	1	Quartermaster	1
Chaplain	1	Medical officer	1
		Chaplain	1

This would make an establishment of 25 individuals, according to one scheme, and 27 or 28 according to the other, including the Governor, but exclusive of the lecturer in chemistry.

The scale of salaries proposed for the above staff is as follows:— Pay of staf

	Yearly.	Maximum annual expense of staff.
	£	£
Governor	1,500	1,500
1 professor of mathematics	500 to 650	650
By a triennial increase of 50*l.*		
3 instructors in mathematics	300 to 450	1,350
By a triennial increase of 50*l.*		
1 professor of fortification	500	500
3 instructors in fortification and geometrical drawing	400	1,200
1 professor of artillery	500	500
1 instructor in do.	400	400
1 professor of military drawing	500	500
4 instructors in do.	400	1,600
1 professor of military history	450	450

* The necessity for drill instructors would be contingent on the organization of the Academy being assimilated to that recommended for Sandhurst. If the alternative proposition should be adopted they would be replaced by three or four company officers, viz., one captain and either two or three lieutenants. An additional officer as Inspector of Studies would also be required. See note on page 39.

	Yearly.	Maximum annual expense of staff.
	£	£
Senior instructor in French and German	350	350
Junior do. do.	300	300
1 instructor in landscape drawing	350	350
1 chemistry lecturer	300	300
Senior drill instructor*	350	350
Junior do.*	300	300
1 chaplain and classical instructor	450	450
1 paymaster and quartermaster 1 surgeon	Salaries to be fixed by the War Office regulations.	
Additional allowance to eight instructors in charge of divisions, each*	75	600
Total maximum annual amount of salaries of staff, exclusive of paymaster and surgeon	—	11,650
House rent for about 13 professors, &c., not provided with quarters, each	50	650
Total annual estimated expense of staff exclusive of paymaster and surgeon		12,300
Present annual expense of military and educational staff, (including half-pay and allowances), also exclusive of paymaster and surgeon, as extracted from the estimates for 1869–70		18,424
Estimated annual saving		6,124

The above salaries should be considered as consolidated rates, including all pay and allowances of every kind, with the exception of the allowance of 50*l.* a year for the members of the staff not provided with quarters, and of the Governor's pay as colonel of a regiment, in the event of his holding such an appointment.

Assistant to the Governor.

The senior drill instructor or the captain of the company, as the case may be, should act as assistant to the Governor in conducting the correspondence of the Academy. This officer, however, should have no control over the professors or instructors.

Religious instruction.

Religious instruction should be regularly imparted to the cadets by the Chaplain by means of lectures, and by voluntary classes on Sundays.

Instruction in classics.

The Chaplain should be also required to give instruction in Latin and Greek by lectures to voluntary classes.

Instruction in drill.

The amount of instruction to be given in drill, and the time to be devoted to this purpose should be left to the discretion of the Governor.

There should be as few parades as possible for non-military purposes.

Riding, &c.

Riding, gymnastics, fencing, and swimming should form part of the ordinary course of instruction.

Excellence in riding, in gymnastics, in fencing, and in swimming, should be encouraged by prizes.

Marks for subjects. Obligatory.

Marks should be assigned to the obligatory subjects of instruction in the following proportions:

Mathematics (to trigonometry)	5
Fortification	7
Artillery	5
Military drawing and reconnaissance	6
Military history, &c.	3
Mechanics	2

Voluntary.

The voluntary subjects should be valued as follows:

Higher mathematics	5
Higher fortification	3
Latin	2

* See notes on preceding pages. There would be little difference in the annual expense of the Academy if the company organization were adopted, as the salaries of the increased staff would be met by the saving on the allowance to the instructors in charge of divisions.

Greek	2
French	2
German	2
Figure and landscape drawing	2

Qualification in obligatory subjects.

No cadet should be ensured a commission unless he qualify by obtaining at least one-fourth of the marks in each of the six obligatory subjects, and one half of the total aggregate of the marks allotted to these subjects.

Minimum for voluntary subjects.

No voluntary subject should gain a cadet any marks unless he obtain more than a minimum of at least one-third in it. The marks gained in the voluntary subjects should be added to those obtained in the obligatory subjects, to make a second total, according to which the cadets should be finally placed.

Conduct of the examinations.

The whole of the marks allotted to each subject should be reserved for the examinations conducted entirely by examiners independent of the Academy at the close of each term. The special examination in obligatory mathematics should take place at the end of the first or second term (the marks being registered); the examinations in the other obligatory subjects and in the three voluntary subjects should take place at the end of each term in which they are studied, a certain proportion of the marks gained in each examination being carried forward to the final examination.

Section VII.

Section V

Accommodation.

Accommodation.

It would be very desirable to provide separate accommodation for each cadet. Whilst doing this, it would be advisable to assign a quarter for an officer to each one or two Divisions of students.*

The halls of study should be sub-divided to correspond with the classes, so that there should no longer be two classes taught, as now, in one room. There appear to be facilities for carrying out this improvement in the size and shape of the halls as at present existing.

Chapel.

It is strongly recommended that arrangements should be made for providing some place in which to conduct Divine Service within the Academy.

IV.—PROPOSED REGULATIONS FOR ADMISSION TO THE ARMY BY DIRECT COMMISSIONS.

Conduct of examinations.

I. The examinations of candidates for Direct Commissions should be held in London at such periods as the exigencies of the service may require, and should be conducted by the Civil Service Commissioners.

Age of admission.

II. The age of candidates examined for direct appointments should be from 17 to 20 years for all branches of the service, the present distinction between the ages for admission to the cavalry, infantry, and colonial corps being abolished.

III. The same medical examination, certificates, &c., should be required as at present.

Subjects of examination.

IV. The following should be the subjects of examination and the scale of marks; but no candidate should be allowed to select more than *five* of these subjects, or *six* if free-hand drawing be one of them:

	Marks.
(1.) Latin	4,000
(2.) Greek	3,000
(3.) Mathematics, limited to arithmetic, geometry, algebra, and plane trigonometry	4,000
(4.) English composition, tested chiefly by the power of writing an essay, letter, or précis	1,000
(5.) French	2,000
(6.) German	2,000
(7.) History, the periods to be taken up being notified beforehand	1,500

* See note on page 39.

	Marks.
(8.) Experimental sciences, the candidate being limited to one of the following subjects, viz., (*a.*) Chemistry, including heat; or (*b.*) Electricity and magnetism -	1,500
(9.) Free-hand drawing (figure and landscape) - -	1,000

Obligatory subjects.

V. Of the foregoing subjects the elementary portions of mathematics, and the English and French (or German) languages, to the extent stated in the next three paragraphs, should be considered obligatory:

1. In mathematics 1,000 marks should be given to the following subjects, viz.
Arithmetic.
Geometry, not beyond the standard of the first book of Euclid.
Of these marks one-third should be required for qualification.

2. In the English language, the candidate should be required to write correctly, and in a good legible hand, from dictation.

3. In French (or German) the candidate should be required to obtain at least 300 marks.

Voluntary subjects.

4. Out of the remaining subjects the candidate should be permitted to select any two, or three if free-hand drawing be one of them.

5. No candidate should be allowed to count the marks gained in any one of the voluntary subjects, unless they amount to one-fourth of the whole number of marks allotted to that subject; and for qualification he should be required to obtain on his five (or six) subjects a total of 2,000 marks.

6. In the examination in classics, passages should be given for translation from the books usually read at schools; grammatical questions should be set, and passages from English prose authors should be given for translation into Latin; translations into Greek prose should not be required, nor verse composition in either language.

VI. The candidates should be placed, and offered commissions, in the order of merit determined by the results of the examination.

Number of trials permitted.

VII. No candidate should be allowed more than three trials.

If a candidate obtains only between 1,000 and 1,500 marks, he should not be allowed to present himself for re-examination for at least six months. If he obtains less than 1,000 marks, a period of at least twelve months should elapse before he is allowed to present himself again.

University students.

VIII. A student from the University of Oxford, Cambridge, Durham, London, Dublin, Edinburgh, St. Andrew's, Glasgow, Aberdeen, or Queen's University, Ireland, who has passed "Responsions" at Oxford, the "Previous Examination" at Cambridge, or the corresponding examination at the other Universities, should be qualified for a commission by purchase without being required to pass the examination for admission to the army, provided he is within the stated limits of 17 and 20 years of age.

IX. In the case of students of any of the above Universities who have passed the examinations necessary for taking a degree in arts, the age for admission to the army by Direct Commissions should be extended to 22 years.

X. The candidates mentioned in the two preceding paragraphs should be required to produce, in addition to certificates of age and moral character, the usual certificates of having passed the University examinations, and should also be medically examined in regard to their physical fitness for the service.

V.—SCHEME FOR SUPPLYING INSTRUCTION TO OFFICERS OF THE GUARDS AND LINE, AND FOR INTRODUCING A SYSTEM OF SPECIAL EXAMINATION.

Special examination in certain subjects to be required.

1. Higher qualifications than are now required, in certain practical branches of military knowledge comprised under sections (*a*) and (*g*) of paragraph 161 of the Queen's Regulations,* should in future be insisted on from all officers of the cavalry, guards,

* The paragraph referred to is as follows:—
Lieutenants in the cavalry and infantry will, before they are recommended for promotion to the rank of captain, be required to show that they are further duly qualified, as follows:—
(*a.*) They must have a thorough knowledge of the provisions of the Mutiny Act and Articles of War, and of the forms and proceedings of courts-martial, and must give evidence of having studied some of the standard works on military law.

and infantry, to be tested by a Special Examination within two years after their joining their regiments or depôts. Officers should not be considered qualified for promotion to the rank of captain until they have passed this examination.* Those who fail in it should not be permitted to present themselves for re-examination until after the expiration of six months. All cases of a second failure should be specially reported upon by the board of examiners to the Horse Guards. Officers in the army under the rank of captain at the time of the promulgation of the order announcing the new regulation should be required to pass the examination within two years from such date as the Secretary of State for War may decide; but it is recommended that this Special Examination should not be exacted in the case of any officer who has passed the existing examination for the rank of captain at the date of the publication of the Report of the Commission.

2. This Special Examination should be in addition to, and independent of, the existing examinations for promotion laid down in paragraphs 159 to 165 of the Queen's Regulations. These should still be adhered to, except so far as regards the subjects specified in sections (*a*) and (*g*) of paragraph 161. The paragraph would no longer require those sections, the subjects referred to in them being dealt with separately under the arrangements now proposed. In addition to the present examinations.

The existing examinations in the subjects mentioned in the remaining sections should, however, be made more stringent than at present, and should be conducted on the same principles as those recommended in paragraph 5 of the present scheme, except as regards the constitution of the board of examination and the nature of the approving authority, which it is not proposed to alter.

3. The Special Examination should comprise the three subjects of— Subjects of the examination.

A. Military Law.

In accordance with section (*a*) of paragraph 161, Queen's Regulations, viz.:

(1.) A thorough knowledge of the provisions of the Mutiny Act and Articles of War, and of the forms and proceedings of Courts-martial should be exacted.

(2.) The candidate for examination should be required to give evidence of having studied some standard work on military law (to be named by competent authority), pending the carrying into effect of the recommendation of the Royal Commission on Courts-martial, that "some kind of text-book on military law and the law of evidence be prepared." When this text-book is published, a knowledge of it should be required. It is strongly recommended that such a book should be prepared without delay.

B. Field Fortification, comprising:

(1.) The distribution of working parties when engaged in throwing up field works.
(2.) Tracing and constructing breast works and the simpler kinds of field works; making rifle pits; putting hedges, walls, bridges, and buildings in a state of defence.
(3.) Making gabions and fascines, and forming revetments of various materials.
(4.) Making and planting palisades, abattis, obstacles, &c.
(5.) Knot-tying, lashing together spars, making trestle and other temporary bridges.
(6.) Laying out encampments, including the construction of field ovens, &c.
(7.) Attack and defence of outposts; street fighting.

C. Field Sketching and Reconnaissance:

To read and understand a military plan, to draw up a report on a road, and to make an intelligible sketch of an outpost, should be considered essential as the lowest qualification in this subject.

(*b.*) They must understand perfectly the evolutions of a regiment of cavalry or a battalion of infantry, as laid down in the regulations for those services respectively.
(*c.*) They must be acquainted with the light infanty drill, duties of out-posts, patrols, escorts, advanced and rear guards.
(*d.*) They must perfectly understand the interior economy of a troop or company, and the established system of keeping their accounts.
(*e.*) They must be thoroughly acquainted with the Queen's and War Office Regulations applicable to their own branch of the service.
(*f.*) They must be competent to take charge of a troop, company, or detachment, in every position in which it may be placed.
(*g.*) And they will be required to show that they have a sufficient knowledge of field fortification and reconnaissance.

* It is proposed that officers who obtain free commissions by passing the final examination at Sandhurst should be exempted from this Special Examination, except in the subject of Military Law. See scheme for the re-construction of Sandhurst, Section VI. (page 37).

Text books.

4. A manual should be prepared under proper authority as soon as possible, embodying the necessary particulars on the subjects referred to under heads B and C.

Mode of conducting the examination.

5. The examination in the three subjects enumerated above should be conducted partly by sealed printed questions sent from the Director-General of Military Education, and partly orally and practically upon the ground by a board of examination. This board should consist of a Field Officer, the Commanding Engineer (or an officer deputed by him and not under the rank of captain), and a Garrison or Regimental Instructor. The latter officer, if possible, should not be the one under whose instruction the candidate has been trained.

The printed questions should invariably be answered in the presence of a member of the board, and be returned with the answers and with a written report of the oral and practical examination to the authority above named, with whom should rest finally the grant of a certificate of competence.

Means of instruction.

Garrison instructors.

6. For the purpose of affording the necessary instruction, qualified officers, not under the rank of captain, with pay and allowances equivalent to those of a deputy assistant quartermaster-general, should be appointed to conduct garrison instructional establishments at certain large stations. The under-mentioned stations at home and in the colonies would probably require to be supplied, at least, with the following number of instructors:—

Aldershot	2 or more.
Shorncliffe	1
Colchester	1
Portsmouth	1
Devonport	1
Dover	1
Chatham	1
Dublin	1
Curragh	1
Cork	1
Gibraltar	1
Malta	1
Halifax	1
Total	14

A similar staff for purposes of instruction should be provided for each division in India, where it appears that 16 Garrison Instructors would probably be required.

Superintending officer.

In addition to the instructors it is recommended that an officer, with the pay and allowances of an assistant quartermaster-general, should be appointed at Aldershot to superintend the local instruction, and supervise the whole system for the army, subject to the orders of the Director-General of Military Education.

A similar officer should be appointed to superintend the system of instruction in India.

Regimental instructors.

7. To every regiment of cavalry and battalion of infantry at home or abroad (including India), which is not likely to be quartered within 12 months after the date of the introduction of the system in one of the stations for which a Garrison Instructor is supplied, a qualified officer, if possible of the rank of captain, should be appointed as Regimental Instructor, with an allowance of 5*s.* 6*d.* per diem. It is considered that in such regiments the separate appointment of musketry instructor should hereafter be dispensed with, the Regimental Instructor being charged with his duties. The Regimental Instructors, when their regiments may at a future time be quartered at stations supplied with Garrison Instructors, should assist the latter in their duties.

The number of regiments and battalions at home and abroad, exclusive of Colonial Corps and of troops on the Indian establishment, to which it would be necessary to appoint Regimental Instructors, may be approximately estimated at about 50.

Attendance at instruction to be obligatory.

8. A certain course of obligatory attendance upon the garrison or regimental instruction should form part of the duty of every officer who has not yet passed the Special Examination; but the precise arrangements for this attendance must necessarily be determined by the Commanding Officer of the district or regiment, as the case may be.

Duties of instructors.

9. All officers, both those wishing to qualify ultimately for the Staff and others, should be permitted to receive instruction in military history and military administration. The instruction in these subjects, under conditions to be laid down by the Director-General of Military Education, should form a part of the regular duty of the Garrison

Instructor. The Regimental Instructor should, at the discretion of the Commanding Officer, be required to perform the same duty.

It should also be the duty of the Regimental Instructor to afford instruction to the rank and file of the regiment, in such of the subjects specified under Section B, as may fall within the duties of a soldier on active service.

Opportunities for instruction in foreign languages.

10. Where practicable, it is strongly recommended that instruction in foreign languages at a nominal charge should also be provided for voluntary classes of officers at large military stations.

Instruction of battalions in field works, &c.

11. Wherever sufficient space and means exist, all battalions should in future be exercised in artillery drill and in throwing up field works, under the orders of the General Officer commanding the camp or district. The direction of this necessary instruction, when not provided for regimentally, should be considered as part of the duty of the Artillery and Engineer officers in command. General Officers should make an examination of what has been done in these subjects by particular regiments a part of their regular half-yearly inspections.

Appointment and training of instructors.

12. Officers who have passed the Staff College should be considered qualified as either Garrison or Regimental Instructors. As a provisional measure, in order to obtain a further supply of Regimental Instructors, if required, it is suggested that Commanding Officers should be permitted to recommend an officer from each regiment or battalion which is not yet provided with a qualified instructor, to proceed to be trained under a special short course of one term at the Staff College, followed by a three months' course at Chatham with the Royal Engineer Establishment. The course at both places should be a practical one, and every candidate should be required to obtain from the Commandant of the Staff College and the Director of the Engineer Establishment certificates stating that he is thoroughly qualified to convey instruction. This provisional arrangement should, however, cease as soon as the number of officers who have passed the Staff College is sufficient to provide the requisite supply of Regimental Instructors.

13. General Officers, in their half-yearly inspection reports of regiments, should in future be called upon to make special mention of officers likely to become efficient instructors.

VI.—INSTRUCTION OF ENGINEER OFFICERS AFTER ENTERING THE SERVICE.

Royal Engineer Establishment, Chatham.

Course of instruction.

The general arrangements of the establishment, and the results of the course of instruction pursued at it, appear to be highly satisfactory. The only suggestion in regard to the latter point which it seems desirable to make is that, in connection with the course of surveying, instruction should be given in road-making, and that special attention should be paid to the construction of roads in mountainous countries. This subject does not at present appear to be taught at Chatham.

Accommodation.

Attention has been drawn to the insufficiency of the existing accommodation, especially as regards the halls of study and the lecture-room. The former are merely ordinary barrack-rooms, and are quite inadequate to fulfil the purposes for which they are employed; the latter, which is designed mainly as a school-room for the men, is very unfit to be the chief place of instruction at the head-quarters of a scientific corps. It is considered that the addition to the Royal Engineer Establishment of such a building as the Royal Artillery Institution at Woolwich would add greatly to its working power. The mess accommodation is also very inadequate to the wants of the present establishment; and it was brought to notice that, such as it is, it has only been completed by incurring a debenture debt, the discharge of which will necessarily rest chiefly on the young officers about to join the corps. Viewing the Royal Engineer Establishment rather as a great educational institution than a mere regimental barrack, it is recommended that the means of remedying the deficiencies which have been noticed should be taken into consideration.

Instruction of Line Officers at Chatham.

With respect to suggestions which have been made for employing the establishment as a means of affording instruction to the officers of the Line generally, it is considered that such an extension of the establishment would be undesirable, and would interfere with its primary objects. At the same time, there appears to be no objection to allowing a small number of officers of the Line, selected on the ground of special qualifications, to receive practical instruction at Chatham in some of the subjects taught

there. Small detachments of officers are at present sent to the establishment for instruction in signalling; and it is recommended, as a temporary measure, that a short special course should be instituted for the training of officers desirous of qualifying for the appointment of Regimental Instructor, after they have gone through a special course at the Staff College.

VII.—INSTRUCTION OF ARTILLERY OFFICERS AFTER ENTERING THE SERVICE.

Instruction of Young Officers.

Before the Crimean war it was the custom to make all young officers of the Artillery join the corps at Woolwich, where they went through a course of practical instruction on first entering the service. Owing to the exigencies of the war this custom was interrupted in 1854, and has only quite recently been resumed. The instruction, however, appears at present to be based on no general regulation of the service, and to be somewhat unsystematically conducted.

The instruction to be systematized.

It is recommended that, on leaving the Academy, the young officers of the Artillery should go through a thoroughly systematic course of instruction at Woolwich and Shoeburyness, lasting for such a period as may be found desirable, and that they should be required to pass an examination at the end of the course.

Subjects to be taught.

The course of instruction should include:—

Practical artillery at Woolwich and Shoeburyness.
A course in the Arsenal, &c.
Elements of veterinary knowledge.
Military law and administration, including correspondence and accounts.
The tactics of the three arms.

The whole of the instruction at Woolwich should be under the Director of the Department of Artillery Studies.

Department of Artillery Studies, Woolwich.

A.—*General Classes.*

Present system to be continued.

At present all officers sent to Woolwich for instruction are attached to the Department of Artillery Studies, and the courses to be pursued by them are arranged by the Director. It is recommended that this system should be continued, and that the young officers of Artillery, while going through the proposed course of instruction at Woolwich, should be placed under the immediate charge of the Director.

Addition to staff.

Some slight addition to the staff of the department may perhaps be rendered necessary by this arrangement; it would probably be advisable to appoint a lecturer on the tactics of the three arms.

Staff College class to be discontinued.

The present class for the officers who have passed through the Staff College will no longer be necessary, as under the new arrangements for the Staff College it is not recommended that these officers should be sent to Woolwich.

B.—*Advanced Class of Artillery Officers.*

Expense to be diminished.

The results of the establishment of the Advanced Class scarcely appear to have been so successful as was anticipated. The importance, however, of affording facilities to officers of the Artillery for obtaining a high mathematical and scientific education is fully recognized. At the same time it is considered that, with the object of diminishing the expense of the institution, the staff of instructors at the Advanced Class should, as far as possible, be combined with that of the Academy, and with that employed for the instruction of the young officers of Artillery.

Abolition of competition.

As the number of officers attending the Class must always necessarily be very limited, it is recommended that the present system of individual competition among the students should be abolished, and that they should be required merely to come up to a qualifying standard at the final examination. It is also recommended that the certificate of having passed the Advanced Class, although a necessary qualification for employment in the manufacturing departments, should confer no absolute personal claim for an appointment.

School of Gunnery, Shoeburyness.

The present state of the establishment and the eminently practical character of the instruction given at it are considered highly satisfactory.

The only alterations suggested would be with the view of extending still further the utility of the establishment as a school of instruction for the Artillery. With this object it is recommended,— Proposed extension of the establishment.

(1.) That the number of officers attending the "long course" should be increased to the maximum number to whom instruction can be afforded, and that "short courses" should be as frequent and as large in number as possible.

(2.) That all young officers of the Artillery on first joining the corps should be sent to the establishment for a short course of practical instruction. In order to carry out this object it would probably be necessary to appoint an additional instructor.

The improvement and enlargement of the officers' quarters are strongly recommended, the existing accommodation being of a very inferior description and quite insufficient to meet the proposed extension of the establishment. Accommodation.

VIII.—RECOMMENDATIONS IN REGARD TO THE STAFF COLLEGE.

Section I.

Section I

General Principles regulating Appointments to the Staff.

Officers of all branches of the service should in future be allowed to pass the final examination at the Staff College, subject to the restrictions mentioned in Section V., without having gone through the course of instruction at the College.

The certificate of having passed this examination, either with or without residence, should in no case be considered as conferring any absolute personal claim to Staff employment; but such a certificate should be a necessary condition of appointment to the General Staff of the Army, except in the case of substantive field officers who had attained, before the 1st of January 1860, the army rank of lieutenant-colonel, and of officers who have shown distinguished ability in appointments on the Staff on active service. The latter exception should not, however, be extended to those who have been employed only in the capacity of aides-de-camp. Appointments to the Staff.

Officers should be appointed to the Staff by selection, on the grounds of their special qualifications for particular posts, as indicated by the reports of the Commandant of the Staff College and of the General Officers to whom they have been attached,* and not with reference to seniority as regards the date of passing the Staff College examination. Selection of candidates.

Officers of the Engineers, like those of other branches of the service, should be required to pass the final examination at the Staff College as a condition of appointment to the Staff.

Of the Personal Staff military secretaries and assistant military secretaries should in future be selected only from among officers who have obtained the Staff College certificate, with the same exceptions as those already mentioned in regard to appointments to the General Staff. Personal Staff. Military secretaries;

Aides-de-camp should continue to be appointed as at present, on passing the examination specified in paragraph 221 of the Queen's Regulations. This qualification should, however, be strictly enforced, and no officer (with the exception stated in the following paragraph) should be appointed, even provisionally, to the post of aide-de-camp who has not passed the examination. Aides-de-camp.

Officers who while cadets at the Royal Military College at Sandhurst have passed with distinction a special examination there (as detailed in the scheme for the reconstruction of Sandhurst), should be qualified for appointments as aides-de-camp without passing a further examination after entering the service.

Garrison Instructors should be appointed exclusively from among officers who have passed the Staff College examination. The same qualification should also eventually be required for Regimental Instructors, as soon as the number of officers who have passed the Staff College is sufficient to provide the requisite supply of such instructors. Garrison and Regimental Instructors.

Section II.

Section II

Mode of Admission, &c.

Admission to the Staff College should be determined by competitive examination open to all arms of the service (including the Royal Engineers), with proper guarantees as to the practical qualifications of the candidate for Staff employment. Competitive examination

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* See Sections V. and VI.

Numbers at the College.

The number of students at the College should be increased to forty, this being the number for which there is accommodation in the buildings.

Twenty vacancies should be competed for each year, five of which should be open to officers of the Artillery and Engineers.

Not more than one officer at a time from a regiment of cavalry or a battalion of infantry should belong to the College, nor more than ten officers at a time from the Artillery and Engineers.

Conditions of admission.

A service of not less than five years previous to the examination should, as at present, be a necessary condition of admission.

With regard to the other qualifications at present required for admission to the College, the following changes are recommended:—

(*a.*) Every candidate, before being admitted to the entrance examination, should be attached for a month to the Staff of a General Officer commanding a brigade or division, who at the expiration of this period should report confidentially upon the officer's fitness for Staff employment.

(*b.*) The certificate required from the Commanding Officer of the regiment should state that the candidate is in every respect a thoroughly good regimental officer.

(*c.*) Specific questions should be transmitted to the Commanding Officer regarding the character, habits, and disposition of the candidate, and his general qualifications for employment on the Staff. These questions should be confidentially answered by a board consisting of the Commanding Officer and the two next senior officers of the candidate's regiment.

(*d.*) The candidate should, as a matter of course, have passed the Special Army Examination in addition to that for a troop or company.

A medical certificate of good health, and fitness for the active duties of the Staff, should be required as at present.

Qualifications required for non-resident examination.

Candidates who present themselves for the final examination at the College, without having gone through the course of residence, should be required to have a previous service of seven years, and similar qualifications in other respects to those exacted from candidates for admission to the College.

Subjects of entrance examination.

The subjects of the entrance examination, and the relative value of each, should be:—

	Marks.
Mathematics, limited to arithmetic, algebra, geometry, plane trigonometry, and elementary mechanics	900
Military history and geography	900
French	300
German	300
Hindustani	300
Fortification	600
Military drawing	300
Geology, exclusive of mineralogy	300
Chemistry, heat, electricity, and magnetism	300

Obligatory subjects.

Of the above subjects a qualification should be exacted from every candidate in the following:—

(1.) Lower mathematics, comprising arithmetic, the first four books of Euclid, and algebra to simple equations. Out of the 900 marks allotted to mathematics, 400 should be assigned to this portion of the subject, of which 250 at least should be required for qualification.

(2.) Either French, German, or Hindustani. The qualifying minimum to be,—in French, 150 marks; in German or Hindustani, 100.

(3.) Elementary field fortification. One-third of the marks assigned to a simple paper should be required as the qualification in this subject.

(4.) The elements of military drawing. The qualification should be similar to that required in elementary field fortification.

Voluntary subjects.

The other subjects, including the higher portions of mathematics, fortification, and military drawing, should be taken up or not at the candidate's option.

In each optional subject a minimum of one-fifth should be fixed, and this minimum should be deducted from all marks gained in that subject.

The subjects of examination in military history should be notified beforehand, as at present.

Section III.

Course of Instruction, Examinations, &c.

The length of the course of instruction should be two years, as at present.

Competition to be abolished.

It is recommended that the system of individual competition should be abolished, and that a system of classification should be introduced in its place. The numerous periodical examinations which at present take place should be discontinued, and marks should not be awarded for the work done during the course of instruction. A probationary examination should be held at the end of the first year, for the purpose of testing the progress of the students, but this examination should have no influence upon the final classification. At the end of the second year a final examination should be held, to test the general proficiency of the officers in the various subjects studied at the College; according to the results of this examination the officers who have passed through the course of instruction, as well as any other officers admitted to the examination without residence at the College, should be classified in two classes, representing "honours" and "pass" respectively. The officers in each class should be arranged either alphabetically or according to the seniority of their regiments in the service. A higher standard of qualification than is at present required should be exacted for the pass examination.

The examinations should be conducted exclusively by examiners independent of the College, and in some of the subjects should be partly *vivâ voce*.

Subjects of instruction.

The course of instruction at the College should be divided into obligatory and voluntary studies. The former should be confined to strictly military subjects, with the addition of one modern language. The position in the first or second class should be determined exclusively by proficiency in the obligatory subjects; but special mention should be made of those candidates who may distinguish themselves in any of the voluntary subjects taught at the College, or in modern languages or landscape drawing.

Obligatory.

The obligatory subjects should be:—

(1.) Fortification and field engineering.
(2.) Artillery.
(3.) Military drawing, field-sketching, and surveying, with the addition of photography as applied to the copying of maps and plans. Road-making, as at present, to be combined with this course.
(4.) Reconnaissance.
(5.) Military art, history, and geography.
(6.) Military administration and legislation.
(7.) Either French, German, or Hindustani.
(8.) Military telegraphy, with the employment of the field telegraph, and signalling.

Qualifying examination in practical mathematics.

Every officer at the end of the first year should be required to pass a qualifying examination in practical mathematics,—comprising mensuration, the mode of determining heights and distances by ground problems, and by the ordinary trigonometrical calculations with the aid of logarithms, and elementary mechanics,—as at present required from those officers who do not take up mathematics as a subject. This examination, however, should have no influence upon the final classification of the officers. Instruction in mathematics, to the above extent, should be afforded to such officers as may require it, during the first year. Beyond this point mathematics should cease to form part of the course of instruction at the College.

Voluntary subjects.

The voluntary subjects of instruction should be as follows:—

(1.) The two languages not selected as obligatory.
(2.) Geology, limited to its military applications and exclusive of mineralogy.
(3.) Experimental sciences, viz., chemistry, heat, electricity, and magnetism, in their practical applications to military science.

Every officer should be allowed to take up any of these subjects, as well as any modern language and landscape drawing, for honourable mention at the final examination, but proficiency in these subjects should not affect his position in the class-list.

With regard to the course of instruction the following changes are recommended:—

All instruction to be practical.

The instruction in all subjects should be made more strictly practical than at present, and should have a direct bearing on the duties of Staff officers in the field.

The elementary portions of field fortification and military drawing being required in the entrance examination, should be omitted from the College course.

Fortification.

More exercise should be afforded in the practical portions of field fortification, such as laying out and constructing works, throwing up entrenchments, projects for the defence of buildings, villages, positions, &c. Less time should be devoted to permanent

fortification, especially as regards the mechanical drawing of plates. The construction of bridges, laying out of field-works, &c., should be practically executed by the officers themselves.

Artillery. The course of lectures on artillery should have special reference to its employment on service, both singly and in combination with the other arms; its use in the attack and defence of positions; the application of its fire to the best advantage in the field; the effects of different kinds of fire, &c. Less attention need be paid to the theory of the science and the details of the construction of ordnance and ammunition.

Reconnaissance, field sketching, &c. The instruction in reconnaissance should be under the personal superintendence of the Commandant. A distinct course of lectures on the subject of reconnaissance, and the disposition of troops for the attack and defence of positions, should be delivered by him. Great importance should be attached to rapidity in the execution of field sketches, reconnaissances, and schemes of all kinds; the number of such compositions should be increased, and the time hitherto allowed for the execution of each should be considerably diminished; eye sketches without instruments should be more frequently executed, and the officers should be required to practice reconnaissance sketching mounted. All field sketches, reconnaissances, &c., should be executed, as far as possible, in the manner which would be necessary on active service, and less importance should be attached to mere elegance of drawing and printing. It is recommended that an additional sum of 100*l.* a year should be annually granted to the College, for the purpose of carrying out a system of reconnaissance on an extended scale.

Road-making. The instruction in road-making, in connection with the course of surveying, should be made more thorough and practical than at present. The actual construction of roads, both in level and hilly districts, and the mode of laying the foundations of roads in difficult ground, should be practically illustrated.

Military history, &c. Increased time should be devoted to the subjects of military history, military administration, and law.

A course of lectures on the drill and movements of the three arms should be given in connection with the subject of military history.

Military administration. A text-book on the subject of administration should be compiled, and the present practice of taking notes at the lectures should no longer be compulsory.

Practical instruction in Staff duties. Instruction should be given *practically* in laying out encampments (including the construction of field ovens, kitchens, huts and other kinds of shelter); the transport of troops, arms, and material by railway; the transport of the sick and wounded; the embarkation and disembarkation of troops, horses, artillery, &c.

In the above and other similar subjects it is recommended that advantage should be taken of the camp at Aldershot and of the flying columns sent from there, in order to afford instruction in the practical duties of Staff officers. The embarkation and disembarkation of troops should, if possible, be practically illustrated at Portsmouth.

Military reports. Greater attention should be paid to the style of framing military reports, as they would be required in practice from Staff officers. The number of reconnaissance reports, and of memoirs in connection with the course of military history should be increased, and similar memoirs and reports should be required in connection with the course of administration.

Telegraphy, &c. Practical operations in telegraphy, in the use of the field telegraph, and in photography as applied to the copying of maps and plans, should be executed by the officers.

Languages. In the final examination great importance should be attached to a colloquial knowledge of languages.

Riding. Instruction in riding should be more frequently attended than at present. It is strongly recommended that, with the object of affording increased instruction in this subject, improvements should be introduced in the riding establishment at Sandhurst. Every officer at the Staff College should also be strictly required to keep a horse; and as many operations as possible connected with reconnaissance and other practical duties of Staff officers should be carried out mounted.

Section IV.

Section IV.

Organization, Staff, &c.

The Staff College should form an entirely distinct establishment from the Cadet College, and be under a separate Commandant.

The Commandant should be appointed on the ground of special qualifications for the post, more particularly as regards practical experience in the duties of the Staff on active service. Appointment of Commandant.

The appointment should be for seven years, with the power of re-appointment; but it should in all cases terminate after 14 years, or at the age of 60.

The military professors should be appointed for seven years, with the power of re-appointment; the civilian professors should in no case retain their posts after the age of 55, unless an extension of their tenure of office is specially recommended by the Commandant and approved of by the Secretary of State. Professors

The office of Adjutant should be abolished. It is suggested that, in the event of the Commandant requiring assistance in his office duties, the officers under instruction at the College might be detailed by turns to act as orderly officers. Reduction of the staff.

The second professor of mathematics and the professor of geology should also be reduced; instruction in geology should be given by the professor of chemistry, whose duties it is proposed in future to confine exclusively to the Staff College.

The staff recommended for the College is as follows:— Proposed staff.

		Salary per annum. £
1	Commandant	800
1	Professor of military history	550
1	do. fortification and artillery	550
1	do. military drawing and surveying	500
1	do. military administration and law	400
1	do. mathematics	£350 to 500
	By a triennial increase of £50.	
1	do. French	350
1	do. German	350
1	do. Hindustani	350
1	do. chemistry and geology	350
	Total annual expense of staff	£4,700

Showing a saving of about 500*l.* on the present annual expense of the staff of the College.* The increased expense consequent on the admission of ten additional students would probably amount to nearly the same sum.

The above rates should include all pay and allowances with the exception of 50*l.* a year, as lodging money, to professors not provided with quarters.

Each of the professors of French, German, and Hindustani should be required to be resident. Duties of the staff

The Commandant should give instruction personally in reconnaissance, and should be responsible for the superintendence of the whole of the instruction.

The practical part of military telegraphy should be taught by one of the military professors.

Photography and the theory of telegraphy should be taught by the professor of chemistry and geology.

The instruction in riding should be carried out by the riding-master of the Cadet College, under arrangements to be made between the Governor of the latter establishment and the Commandant of the Staff College.

Similar arrangements should also be made for such assistance as may be required at the Staff College from the men of the Royal Engineers attached to the Cadet College.

The Commandant, in arranging the details of the course of instruction, should be assisted by a College Board composed of the professors. College Board.

Section V. Section

Miscellaneous Regulations.

A stringent system of confidential reports should be introduced, entering minutely into the character and abilities of every officer at the College, and his qualifications for Staff employment. These reports should be forwarded at the end of every term by the Confidential Reports.

* The saving of 300*l.* a year by the reduction of the professor of geology is not included in this estimate as credit has been already taken for it in the estimate for the Cadet College.

Commandant to the Commander-in-Chief. Any student who is reported unlikely to make an efficient Staff officer in any of the departments of the Staff should be recommended to leave the College.

Similar reports should be forwarded at the end of the course, stating for what particular department of the Staff each officer, from his abilities and proficiency in the subjects of instruction, as indicated both during the course and by the results of the final examination, appears to be best fitted.

The present qualification in high mathematics for employment in the Topographical Department should be abolished. As the condition of recommendation for appointments in that Department, officers should be required to give proof of a knowledge of the following three languages,—French, German, and Italian,—together with proficiency in military drawing.

Candidates presenting themselves for the final examination, without having gone through the course of instruction, should be required to reside for six weeks or two months at the College previous to the examination, in order to be examined by the Commandant in field-sketching, reconnaissance, and the other practical subjects of instruction at the College. They should also pass the qualifying examination in practical mathematics, required from students at the College at the end of the first year. They should, in addition, be subjected to an examination in riding.

As a temporary measure, a special short course of one term at the College should be instituted for the purpose of training candidates for the appointment of Regimental Instructor, as recommended in the scheme for supplying instruction to officers in the army.

To meet the increased expense to which officers are put while at the College, it is recommended that a moderate staff of permanent servants should be provided for the students at the public expense.

Section VI.

Practical Instruction after leaving the College.

The present system of attaching officers after leaving the Staff College to the various arms of the service should be discontinued.

Instead of this, it is recommended that all officers who have passed the final examination, either with or without residence, should be attached for three months during the following summer drill-season to the Staff of a General Officer at some camp where all the three arms of the service are present. During this period they should be regularly employed as acting Staff Officers, and should be required to make themselves acquainted with the organization of the several arms, and with the combined movements of troops. At the end of the three months a confidential report should be forwarded by the General Officer, stating minutely their abilities, the manner in which they have performed their duties, and the department of the Staff for which they appear most fitted.

It is recommended that those officers who have been favourably reported upon as likely to prove qualified for Staff employment, should on all possible occasions, if not holding permanent appointments, be employed temporarily as extra Staff officers, whenever additional assistance may be required by the permanent Staff.

LIST OF WITNESSES EXAMINED BEFORE THE ROYAL COMMISSION ON MILITARY EDUCATION.

Date.	Name, &c. of Witnesses.	Subjects of Examination.
1868.		
July 1 -	Major-General W. C. E. Napier, Vice-President of the Council of Military Education.	Council of Military Education. Examinations for Direct Commissions. Royal Military College, Sandhurst.
„ 3 -	Major-General W. C. E. Napier, further examined.	Royal Military College.
„ 7 -	Major-General W. C. E. Napier, further examined.	Royal Military College. Royal Military Academy, Woolwich.
„ 8 -	Major-General W. C. E. Napier, further examined.	Staff College. Examinations for Direct Appointments to the Staff. Advanced Class of Artillery Officers.
„ 9 -	Major-General Sir F. Abbott, C.B., Member of the Council of Military Education.	Examinations for Direct Commissions. Royal Military College. Royal Military Academy.
„ „ -	Rev. Canon Moseley, F.R.S., Member of the Council of Military Education.	Examinations for Direct Commissions, and for Admission to Sandhurst and Woolwich. Preparatory Establishments.
„ 15 -	Lieut.-Colonel Whitworth Porter, Royal Engineers, late Instructor in Fortification at the Royal Military College.	Royal Military College. Staff College.
„ „ -	Rev. Canon Heaviside, Mathematical Examiner under the Council of Military Education.	Examinations for Direct Commissions, and for Admission to Sandhurst and Woolwich. Mathematical Studies at Sandhurst and Woolwich.
„ „ -	Rev. Osborne Gordon, M.A., Classical Examiner under the Council of Military Education.	Examinations for Direct Commissions, and for Admission to Sandhurst and Woolwich. State of Public School Education.
„ „ -	Rev. F. W. Vinter, M.A., Professor of Mathematics at the Royal Military College.	Royal Military College.
„ „ -	Captain Edmond Walker, Royal Engineers, late Senior Instructor in Military History at the Royal Military College.	Royal Military College.
„ 22 -	Captain Edmond Walker, further examined. -	Royal Military College.
„ „ -	Captain L. A. Hale, Royal Engineers, Instructor in Fortification at the Royal Military College.	Royal Military College.
„ „ -	Brevet-Major W. R. Farmar, 75th Regiment, Captain of a Company of Gentlemen Cadets at the Royal Military College.	Royal Military College.
„ 24 -	Brevet-Colonel E. G. Hallewell, Commandant of the Royal Military College.	Royal Military College.
1869.		
March 2 -	Brevet-Colonel J. E. Addison, Major and Superintendent of Studies at the Royal Military College.	Royal Military College.
„ 4 -	Ensign E. W. W. Dering, 25th Regiment. -	Royal Military College.
„ „ -	Rev. G. Frost, M.A. - - -	Preparatory Establishments for the Military Examinations.
„ „ -	Ensign C. A. Mott, 2nd Regiment. - -	Royal Military College.
„ 9 -	G. W. Dasent, Esq., D.C.L., Examiner in English Language and Composition under the Council of Military Education.	Examinations for Direct Commissions, and for Admission to Sandhurst and Woolwich.
„ „ -	Ensign J. E. H. Prior, 80th Regiment. -	Royal Military College.
„ „ -	Major-General H. D. White, C.B., Commanding the Cavalry Brigade, Aldershot.	Results of Sandhurst Education. Staff College.
„ „ -	Major-General G. J. Carey, C.B., Commanding the 2nd Infantry Brigade, Aldershot.	Results of Sandhurst Education.
„ 11 -	Major-General the Right Hon. Percy E. Herbert, C.B., M.P., now Major-General the Right Hon. Sir Percy E. Herbert, K.C.B.	Royal Military College. Results of Education at it. Staff Appointments.

Date.	Name, &c. of Witnesses.	Subjects of Examination.
1869.		
March 11 -	Brevet-Colonel J. J. Hort, Lieut.-Colonel Commanding the 44th Regiment.	Results of Sandhurst Education. Staff College.
„ „ -	Brevet-Colonel J. W. S. Smith, C.B., Lieut.-Colonel Commanding the 1st Depôt Battalion, Chatham.	Results of Sandhurst Education.
„ „ -	Lieut.-General Sir D. A. Cameron, K.C.B., Governor of the Royal Military College (a Member of the Commission).	Royal Military College.
„ 12 -	Lieut.-General Sir D. A. Cameron, K.C.B., further examined.	Royal Military College.
„ „ -	His Royal Highness the Duke of Cambridge, KG., G,C.B., K.P., G.C.M.G., the Field Marshal Commanding-in-Chief.	Royal Military College. Instruction of officers in the Service.
April 6 -	Rev. Dr. Barry, Principal of King's College, late Principal of Cheltenham College.	Military Instruction at Public Schools.
„ „ -	Rev. T. A. Southwood, M.A., Head Master of the Modern Department, Cheltenham College.	Military Instruction at Public Schools.
„ „ -	Rev. Dr. Benson, Head Master of Wellington College.	Military Instruction at Public Schools.
„ „ -	Rev. Dr. Temple, Head Master of Rugby School.	Military Instruction at Public Schools.
„ 8 -	Major-General the Right Hon. Sir H. K. Storks, G.C.B., G.C.M.G., Controller-in-Chief and Under Secretary of State for War.	Instruction of Officers in the Service. Age of Admission to the Army.
„ „ -	Lieut.-General Lord W. Paulet, K.C.B., Adjutant-General to the Forces.	Instruction of Officers in the Service. Staff College.
„ „ -	Lieut.-General the Hon. Sir J. Yorke Scarlett, G.C.B., Commanding the Aldershot Division.	Instruction of Officers in the Service. Staff College.
„ „ -	Lieut.-General Sir J. Hope Grant, G.C.B., Quartermaster-General to the Forces.	Instruction of Officers in the Service. Staff College.
„ 13 -	General Sir W. J. Codrington, G.C.B. -	Instruction of Officers in the Service. Staff Appointments.
„ „ -	Brevet-Colonel F. C. A. Stephenson, C.B., Lieut.-Colonel Commanding the Scots Fusilier Guards.	Instruction of Officers in the Service. Staff Appointments.
„ „ -	Brevet-Colonel Valentine Baker, Lieut.-Colonel Commanding the 10th Hussars.	Age of admission to the Army. Instruction of Officers in the Service. Staff College.
„ „ -	Captain H. M. Hozier, 3d Dragoon Guards. -	Instruction of Officers in the Service. Staff College.
„ 15 -	Viscount Walden, late Captain and Lieut.-Colonel, Grenadier Guards.	Instruction of Officers in the Service.
„ „ -	His Royal Highness the Duke of Cambridge, K.G., further examined.	Instruction of Officers in the Service. Royal Military College. Amalgamation of Woolwich and Sandhurst. Staff College.
„ 20 -	Major-General J. L. A. Simmons, C.B., Royal Engineers, now Major-General Sir J. L. A. Simmons, K.C.B., Lieut.-Governor and Commandant of the Royal Military Academy, Woolwich.	Royal Military Academy. Royal Engineer Establishment, Chatham. Instruction of Officers in the Service.
„ „ -	Brevet-Colonel G. T. Field, Royal Artillery, Inspector of Studies and Second Commandant, Royal Military Academy.	Royal Military Academy.
„ 22 -	Captain E. J. Bruce, Royal Artillery, Assistant Inspector of Studies, Royal Military Academy.	Royal Military Academy.
„ „ -	Second Captain H. Brackenbury, Royal Artillery, Professor of Military History at the Royal Military Academy.	Royal Military Academy.
„ 27 -	Brevet-Lieut.-Colonel C. H. Owen, Royal Artillery, Professor of Artillery at the Royal Military Academy.	Royal Military Academy.
„ „ -	Lieut. H. H. S. Cunynghame, Royal Engineers.	Royal Military Academy.
„ „ -	Lieut. W. A. Nugent, Royal Engineers. -	Royal Military Academy.
„ „ -	J. J. Sylvester, Esq., M.A., F.R.S., Professor of Mathematics at the Royal Military Academy.	Royal Military Academy.

Date.	Name, &c. of Witnesses.	Subjects of Examination.
1869.		
April 29 -	Brevet-Lieut.-Colonel G. A. Milman, Royal Artillery, Captain of a Company of Gentlemen Cadets at the Royal Military Academy.	Royal Military Academy. Staff College examinations.
„ „ -	Lieut. F. Nicolson, Royal Artillery. - -	Royal Military Academy.
„ „ -	Captain T. B. Strange, Royal Artillery, Instructor in Gunnery at the Royal Military Repository, Woolwich.	Royal Military Academy. Instruction of Artillery Officers after entering the Service. Instruction of Staff College Officers at Woolwich.
May 4 -	Major-General J. H. Lefroy, Royal Artillery, Director-General of Ordnance.	Amalgamation of Woolwich and Sandhurst. Royal Military Academy. Artillery Advanced Class.
„ „ -	Brevet-Lieut.-Colonel C. F. Young, Royal Artillery, Director of Artillery Studies, Woolwich.	Department of Artillery Studies. Artillery Advanced Class.
„ „ -	Captain C. B. Brackenbury, Royal Artillery, Assistant Director of Artillery Studies, Woolwich.	Royal Military Academy. Department of Artillery Studies. Artillery Advanced Class. Instruction of Officers in the Service.
„ „ -	Second Captain A. Ford, Royal Artillery. -	Artillery Advanced Class.
„ 6	Rev. A. C. Fraser, Chaplain to the Royal Military Academy.	Royal Military Academy.
„ „ -	Brevet-Colonel T. E. Lacy, Commandant of the Staff College.	Staff College.
„ „ -	Brevet-Colonel E. B. Hamley, C.B., Royal Artillery, Member of the Council of Military Education; formerly Professor of Military History at the Staff College.	Staff College. Council of Military Education.
„ „ -	Captain H. Schaw, Royal Engineers, Professor of Fortification and Artillery at the Staff College.	Staff College.
June 1 -	Major C. Adams, Professor of Military History at the Staff College.	Staff College.
„ „ -	Rev. J. F. Twisden, M.A., Professor of Mathematics at the Staff College.	Staff College.
„ „ -	Captain E. M. Jones, 20th Regiment, Professor of Military History at the Cadet College, Sandhurst; formerly Adjutant at the Staff College.	Staff College.
„ „ -	Captain A. L. Walker, 99th Regiment. -	Staff College. Regimental instruction of Officers.
„ 4 -	Brevet-Major G. D. Barker, 64th Regiment, Deputy Assistant Quartermaster-General, South Western District.	Staff College. Instruction of Officers in the Service.
„ „ -	Lieut. E. Baring, Royal Artillery. - -	Staff College.
„ „ -	Brevet-Colonel W. O. Lennox, C.B., V.C., Royal Engineers, Instructor in Field Fortification at the Royal Engineer Establishment, Chatham.	Royal Engineer Establishment, Chatham. Survey Class at Aldershot. Instruction of Officers in the Service.
„ „ -	Major-General Sir E. C. Warde, K.C.B., Commanding the Woolwich District.	Royal Military Academy. Instruction of young Artillery Officers.
„ 7 -	Lieut.-General W. F. Forster, K.H., Military Secretary.	Royal Military College. Staff College. System of instruction for Officers in the Service.
„ „ -	Lieut.-General the Right Hon. J. Peel. -	Amalgamation of Woolwich and Sandhurst. Instruction of Officers in the Service. Council of Military Education. Examinations for admission to military schools.
„ 12 -	General the Right Hon. Lord Strathnairn, G.C.B., G.C.S.I., Commanding the Forces in Ireland.	Instruction of Officers in the Service. Staff College. Examinations for admission to the Army.
„ „ -	His Royal Highness the Duke of Cambridge, K.G., further examined.	Royal Military Academy. Royal Military College. Staff College. Instruction of Officers in the Service.
July 13 -	Theodore Walrond, Esq., M.A., Secretary to the Civil Service Commissioners.	Mode of conducting examinations under the Civil Service Commissioners. Examinations for the Indian Civil Service.

LIST OF WITNESSES FROM WHOM WRITTEN ANSWERS HAVE BEEN RECEIVED IN REPLY TO QUESTIONS ADDRESSED TO THEM BY THE COMMISSION.

ON THE SUBJECT OF THE ROYAL MILITARY COLLEGE, SANDHURST.

Brevet-Colonel W. H. Adams, Professor of Fortification at the Royal Military College.
Second Captain L. Griffiths, Royal Artillery, Instructor in Fortification at the Royal Military College.
Memoranda on subjects connected with the Royal Military College were also received from Colonel Addison, Major and Superintendent of Studies, and from Captain E. Walker, late Instructor in Military History.

ON THE SUBJECT OF THE ROYAL MILITARY ACADEMY, WOOLWICH.

J. J. Sylvester, Esq., M.A., F.R.S., Professor of Mathematics at the Royal Military Academy.
Lieut.-Colonel J. J. Wilson, Royal Engineers, Professor of Fortification at the Royal Military Academy.
Brevet-Lieut.-Colonel C. H. Owen, Royal Artillery, Professor of Artillery at the Royal Military Academy.
Brevet-Lieut.-Colonel G. A. Milman, Royal Artillery, Captain of a Company of Gentlemen Cadets at the Royal Military Academy.
Brevet-Major W. J. Stuart, Royal Engineers, Instructor in Fortification at the Royal Military Academy.
Captain T. B. Strange, Royal Artillery, Instructor in Gunnery at the Royal Military Repository, Woolwich.
Captain C. B. Brackenbury, Royal Artillery, Assistant Director of Artillery Studies, Woolwich.
Second Captain H. Brackenbury, Royal Artillery, Professor of Military History at the Royal Military Academy.
A Memorandum on the Subject of the Royal Military Academy was also received from Colonel Field, Inspector of Studies and Second Commandant.

ON THE SUBJECT OF THE INSTRUCTION OF OFFICERS AFTER JOINING THE SERVICE.

General Sir W. R. Mansfield, K.C.B., G.C.S.I., Commander-in-Chief in India.
Lieut.-General W. F. Forster, K.H., Military Secretary.
Lieut.-General Lord W. Paulet, K.C.B., Adjutant General to the Forces.
Lieut.-General Sir. J. Hope Grant, G.C.B., Quartermaster-General to the Forces.
Lieut.-General the Hon. Sir. J. Yorke Scarlett, G.C.B., Commanding the Aldershot Division.
Major-General Sir. A. H. Horsford, K.C.B., Commanding the 3d Infantry Brigade, Aldershot.
Major-General D. Russell, C.B., Commanding the South Eastern District.
Major-General W.C.E. Napier, Vice-President of the Council of Military Education.
Major-General the Earl De La Warr, C.B.
Brevet-Colonel C. Cameron Shute, C.B., Lieutenant Colonel Commanding the 4th Dragoon Guards.
Brevet-Colonel F. R. Elrington, Lieutenant-Colonel Commanding the 4th Battalion Rifle Brigade.
Brevet-Colonel the Hon. H. H. Clifford, C.B., V.C., Deputy Quartermaster-General to the Forces.
Brevet-Colonel J. W. Armstrong, C.B., Deputy Adjutant-General, Ireland.
Viscount Walden, late Captain and Lieutenant Colonel, Grenadier Guards.
Captain and Lieut.-Colonel H. C. Fletcher, Scots Fusilier Guards.
Brevet-Major O' B. B. Woolsey, Royal Artillery, in charge of the Survey Class at Aldershot.

ON THE SUBJECT OF THE STAFF COLLEGE.

Lieut.-General W. F. Forster, K.H., Military Secretary.
Brevet-Colonel the Hon. H. H. Clifford, C.B., V. C., Deputy Quartermaster-General to the Forces.
Brevet-Colonel J. W. Armstrong, C.B., Deputy Adjutant-General, Ireland.
Brevet-Colonel E. B. Hamley, C.B., Royal Artillery, Member of the Council of Military Education; formerly Professor of Military History at the Staff College.
Brevet-Colonel T. E. Lacy, Commandant of the Staff College.
Brevet-Colonel the Hon. W. H. A. Feilding, Coldstream Guards, Assistant Adjutant-General, Dublin Division.
Rev. J. F. Twisden, M.A., Professor of Mathematics at the Staff College.
Major C. Adams, Professor of Military History at the Staff College.
Brevet-Major G. P. Colley, 2d Regiment, Brigade Major, Western District.
Brevet-Major G. D. Barker, 64th Regiment, Deputy Assistant Quartermaster-General, South Western District
Brevet-Major A. S. Jones, V.C., 13th Regiment, Adjutant of the Staff College.
Captain H. Schaw, Royal Engineers, Professor of Fortification and Artillery at the Staff College.
Captain E. M. Jones, 20th Regiment, Professor of Military History at the Cadet College, Sandhurst; formerly Adjutant at the Staff College.
Captain G. M. Cardew, 67th Regiment, Deputy Assistant Adjutant-General, Ireland.
Captain A. L. Walker, 99th Regiment.
A memorandum on the subject of the Staff College was also received from Captain J. N. Crealock, 95th Regiment.

ON MISCELLANEOUS SUBJECTS CONNECTED WITH THE EDUCATION AND TRAINING OF OFFICERS.

Brevet-Colonel Valentine Baker, Lieut.-Colonel Commanding the 10th Hussars.
Brevet-Colonel A. C. Robertson, Lieut.-Colonel Commanding the 2nd Battalion 8th Regiment.

ON THE SUBJECTS OF THE DEPARTMENT OF ARTILLERY STUDIES AND THE ADVANCED CLASS OF ARTILLERY OFFICERS.

Brevet-Lieut.-Colonel C. F. Young, Royal Artillery, Director of Artillery Studies, Woolwich.
Captain C. B. Brackenbury, Royal Artillery, Assistant Director of Artillery Studies, Woolwich.

ON THE SUBJECT OF THE SCHOOL OF GUNNERY, SHOEBURYNESS.

Colonel T. Elwyn, Royal Artillery, Commandant and Superintendent of the School.

ON THE SUBJECT OF THE ROYAL ENGINEER ESTABLISHMENT, CHATHAM.

Brevet-Colonel T. L. J. Gallwey, Royal Engineers, Director of the Establishment.

ON THE SUBJECT OF THE SURVEY CLASS, ALDERSHOT.

Brevet-Major O'B. B. Woolsey, Royal Artillery, in charge of the Survey Class.

SUMMARY OF THE PROCEEDINGS OF THE COMMISSION.

The Commission was issued on the 23rd of June 1868.

The first meeting of the Commissioners was held on the 27th of June.

On the 23rd of February 1869 Lord Dufferin and Clandeboye was appointed Chairman in consequence of the resignation of the Earl de Grey and Ripon; Major-General Eardley-Wilmot was at the same time appointed a Commissioner in the room of Major-General Lefroy, and Mr. C. S. Parker, M.P., was added to the Commission.

Witnesses were examined at various times within a period extending from the 1st July 1868 to the 13th July 1869. The total number examined was 68.

Printed questions on various subjects were also addressed to the authorities of the several educational establishments and to other officers at intervals between the commencement of March and the end of July 1869.

A list of the witnesses orally examined, and of those from whom written replies were received is prefixed.

Numerous returns and other documents were called for by the Commissioners at various times during the progress of their enquiries.

The minutes of the evidence of the witnesses, together with the replies to questions, the returns and other documents will be published at a later period.

In the autumn of 1868 the Secretary was sent to France and Prussia to report upon the systems of military education in those countries. At the same time Colonel MacDougall, at the request of the Commissioners, undertook a mission from Canada to the United States, for the purpose of visiting the Military Academy at West Point. The reports furnished by these officers, together with accounts received from other sources of the systems of military education in foreign countries, will be published as an Appendix to the Report of the Commission.

The Commissioners visited the several establishments connected with the education of officers at the following times in the year 1869 :—

Royal Military College, Sandhurst, and Staff College.	13th March.
Royal Military Academy, Department of Artillery Studies, and Repository, Woolwich.	7th May.
Royal Engineer Establishment, Chatham.	16th July.
School of Gunnery, Shoeburyness.	21st July.

The total number of meetings held by the Commissioners, between the 27th June 1868 and the 9th August 1869, is 63.

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For Her Majesty's Stationery Office.

FIRST REPORT

OF

THE ROYAL COMMISSION

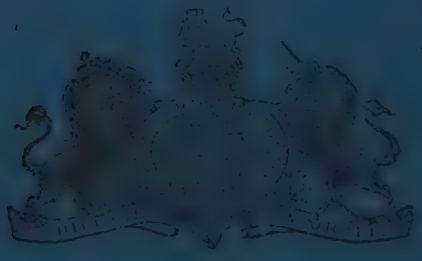
APPOINTED TO INQUIRE INTO THE

PRESENT STATE OF MILITARY EDUCATION

AND INTO THE

TRAINING OF CANDIDATES FOR COMMISSIONS IN THE ARMY.

Presented to both Houses of Parliament by Command of Her Majesty.



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PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1869.

NATIONAL GALLERY.

RETURN to an Order of the Honourable The House of Commons, dated 16 February 1869;—*for*,

COPY "of ANNUAL REPORT of the DIRECTOR of the NATIONAL GALLERY to the LORDS of the TREASURY, for the Year ended the 31st day of December 1868."

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REPORT.

National Gallery,
January 1869.

My Lords,

I HAVE the honour to submit to your Lordships the Annual Report on the National Gallery for the year ending 31st December 1868.

The present list of Trustees, in the order of their nomination, is as follows:—

The Lord Overstone.	The Marquis of Northampton.
William Russell, Esq.	Austen Henry Layard, Esq.
Thomas Baring, Esq.	William Henry Gregory, Esq.

The subjects of the present Report are:—

I. Pictures purchased during the year.

II. Former Purchases.

III. Bequests and Donations.

IV. Details relating to the Gallery and Establishment.

I.—PICTURES purchased during the year 1868.

1. A picture by Dierick Bouts, of Haarlem (commonly, by corruption of his name, called Stuerbout) was purchased from Lady Eastlake, in March.

2. A large altar-piece by Carlo Crivelli, in thirteen compartments, was purchased in Paris, in the month of May.

3. The sketch by John Singleton Copley of his large picture at Guildhall, in the City of London, of the "Siege and Relief of Gibraltar," was bought in July.

4. An unfinished picture of the "Entombment," ascribed to Michelangelo, was purchased in the month of August.

For details relating to the above pictures, *see* Appendix, No. 1.

II. Former Purchases.

1. *Pellegrino da San Daniele* or *Pellegrino da Udine.*—An altar-piece, representing "The Madonna and Child, enthroned, with Saints," described in the last Report, p. 4, numbered 778; is not yet placed in the Gallery from want of space.

2. *Paolo Morando.*—"The Madonna and Child, St. John the Baptist, and an Angel," described in the last Report, p. 4; was placed in the Gallery in March, numbered 777.

3 and 4. *Ambrogio Borgognone.*—"Family Portraits," described in the last Report, pp. 4, 5; placed in the Gallery in March, numbered 779 and 780.

5. *Antonio Pollajuolo.*—"The Archangel, Raphael and Tobias," described in the last Report, p. 4; placed in the Gallery in March, numbered 781.

6. *Sandro Botticelli.*—"The Madonna and Child," described in the last Report, p. 4; placed in the Gallery in April, numbered 782.

III.—Bequests and Donations.

Bequests.

1. "Portrait of Mr. William Siddons." Bust, by John Opie, R.A. (b. 1761, d. 1807.) Painted in oil, on canvas; measure, 2 ft. 6 in. high by 2 ft. 1 in. wide. Bequeathed by Mrs. Cecilia Combe, Mr. Siddons' daughter. Received in April 1868; hung in the Gallery at South Kensington in June following, numbered 784.

2. "Portrait of Mrs. Sarah Siddons." Bust, by Sir Thomas Lawrence, P.R.A. (b. 1769, d. 1830). Painted in oil, on canvas; measure, 2 ft. 6 in. high by 2 ft. 1 in. wide. Bequeathed by Mrs. Cecilia Combe, Mrs. Siddons' daughter. Received in April 1868; hung in the Gallery at South Kensington in June following, numbered 785.

3. "Portraits of Mr. James Baillie, of Ealing, his wife, and four children." By Thomas Gainsborough, R.A. (b. 1727, d. 1788). Painted in oil, on canvas; measure, 8 ft. 2 in. high by 7 ft. 5 in. wide. Bequeathed in 1857, by Mr. Alexander Baillie, of Naples, but by the sanction of the Lords of the Treasury (letter dated 18th January 1858), retained for his life by the testator's nephew, Mr. M. J. Higgins, of 71, Eaton Square. Received in September 1868; numbered 789; owing to want of space, not yet exhibited to the public.

4. The following selection of twelve oil pictures and drawings in water-colours has been bequeathed to the National Gallery by the late Mr. Charles Fraser, of 15, Lancaster Gate, such twelve pictures and drawings to remain in the possession of his nephew, Simon James Gordon Fraser, during his lifetime:—

Water-colour Drawings:

1. *William Hunt*—"Grapes, plums, peach, apricot, &c.—a collection of fruit."
2. *William Hunt*—"A man's head—the Patriarch of the Village."
3. *William Hunt*—"A Peasant Girl."
4. *William Hunt*—"A Water-carrier."
5. *William Hunt*—"Apples—the Contrast—Russet and Green."
6. *David Roberts*—"Edward the Confessor's Shrine."
7. *T. S. Cooper*—"Cow and Two Sheep reposing."
8. *Birket Foster*—"Cottage at Hambledon."
9. *S. Prout*—"Street in Antwerp."
10. *Frederick Tayler*—"Scotch Greys."

Oil Paintings:

11. *Henriette Browne*—"A Greek Captive (Portrait of a Girl)."
12. *E. W. Cooke*—"Near Venice—a Boat, &c."

Donations.

1. "The Raising of Lazarus," by B. R. Haydon (b. 1786, d. 1846). Painted, in 1822, in oil, on canvas; measure, 14 ft. 6 in. high by 20 ft. 9 in. wide. Presented by Mr. R. E. Lofft; accepted in February 1868; numbered 786; cannot be exhibited at present from want of space.

2. "A Nun," by H. W. Pickersgill, R.A. Painted in oil, on canvas; measure, 2 ft. 11 in. high by 2 ft. 3 in. wide. Presented by the painter in the month of October; numbered 791. Not yet exhibited.

3. "A Woodman," by Thomas Barker, of Bath (b. 1769, d. 1847). Painted in oil, on canvas, 7 ft. 9 in. high by 4 ft. 10¼ in. wide. Presented by Mr. R. E. Lofft in the month of November; numbered 792. Not yet exhibited.

4. Bust, in marble, of Thomas Stothard, R.A., by Henry Weekes, R.A. Presented in July 1868, by an Association of Gentlemen; placed in the entrance hall.

IV.—Details relating to the Gallery and Establishment.

Pictures protected with Glass.

During the year 1868, fifteen pictures have been protected with glass, comprising six recently acquired. Appendix, No. 2.

Pictures repaired, or cleaned and varnished.

The following eleven pictures were, in the month of October, washed and freed from all surface dirt, and re-varnished:—

No. 38. "The Abduction of the Sabine Women," by Rubens.
„ 46. "Peace and War," by Rubens.
„ 59. "The Brazen Serpent," by Rubens.
„ 194. "The Judgment of Paris," by Rubens.
„ 27. "Pope Julius II.," by Raphael.
„ 3. "Concert," by Titian.
„ 4. "A Holy Family," by Titian.
„ 193. "Lot and his Daughters," by Guido.
„ 196. "Susannah and the Two Elders," by Guido.
„ 36. "A Land Storm," by Gaspar Poussin.
„ 789. "The Baillie Family," by Gainsborough.

No. 40. "A Landscape and Figures," called "Phocion," by Nicholas Poussin, was cleaned and re-varnished.

Number of Visitors to the National Gallery.

The Collections have been visited by 1,610,721 persons on the public days during the year 1868; 729,645 at Trafalgar-square, and 881,076 at South Kensington.*

The particulars relating to this subject, respecting copying in the Galleries, and the number of catalogues sold, will be found in the Appendix, Nos. 3, 4, and 5.

Details relating to the Establishment.

On the 23rd of November 1868, Michael Callaghan, senior assistant porter at Trafalgar-square, died. On the 25th of the same month, Robert Rudland, curator at South Kensington, died.

In the month of December (by Treasury letter dated the 22nd ultimo), Archibald Archer, assistant porter at South Kensington, was promoted to be curator there, and John Dixon, assistant porter and stoker, was promoted to be assistant porter at Trafalgar-square, in the place of Callaghan, deceased.

The general account relating to the establishment is, by the direction of the Lords Commissioners of the Treasury, sent in by the keeper and secretary, monthly and annually, to the Exchequer and Audit Department, Somerset House.

I have, &c.
(signed) *W. Boxall.*

To the Lords Commissioners of
Her Majesty's Treasury.

APPENDIX.

Appendix, No. 1.

Details respecting Pictures purchased for the National Gallery during the Year ending 31st December 1868.

I. *Dierick Bouts* (about 1391-1475).—Dutch School. "The Exhumation of St. Hubert, Bishop of Liege;" composition of many small figures, before the altar of a handsome gothic church; the body of the saint in his robes, and with the mitre on his head, is supported by two monks just above the opening of the grave; at his feet kneels a bishop incensing the body. Painted in oil on wood; measure, 2 ft. 11½ in. high by 2 ft. 8 in. wide. Formerly in the Collection of Mr. Beckford, at Fonthill, where it was described as the "Burial of a Bishop," by John Van Eyck. Purchased from the Collection of the late Sir Charles Lock Eastlake, P.R.A., in March 1868, for 1,500 *l.* Protected with glass, and placed in the Gallery in April; numbered 783.

II. *Carlo*

* The whole numbers of those visiting the South Kensington Museum are recorded, as the proportion visiting the National Gallery Rooms cannot be ascertained.

II. *Carlo Crivelli* (painted 1468–1495).—Venetian School. A large altar-piece in three stages and in thirteen compartments, representing "The Madonna and Child, enthroned, surrounded by Saints."

Lower Stage (five pictures). In the centre is the Madonna, with a jewelled crown and seated on a marble throne, with the Infant Christ sleeping in her lap. Inscribed below the throne OPUS KAROLI CRIVELLI VENETI 1476. Painted in tempera, on wood: measure, 4 ft. 3½ in. high by 2 ft. 1 in. wide: circular top.

On the Virgin's right, next to her, is "St. Peter," in pontifical robes, with the triple tiara on his head, his costume being enriched with portions in relief, and studded with imitation pearls and other jewels: in his left hand he holds his pastoral staff, and in his right a book and the two keys.

Beyond St. Peter is "St. John the Baptist, in the Wilderness," with cross and scroll bearing the motto *Ecce Agnus Dei.*

On the left of the Virgin is "St. Catherine of Alexandria," her right hand resting on a wheel, in her left she holds the palm of martyrdom.

Beyond St. Catherine is "St. Domenick," seen in profile, who holds in his left hand a book and a lily. Whole-length figures, painted in tempera, on wood; each of the four panels measuring 4 ft. high by 1 ft. 4 in. wide, with circular tops.

Second Stage (four pictures). Over the Baptist is "St. Francis with the Stigmata;" over St. Peter, "St. Andrew the Apostle," with cross and book; over St. Catherine, "St. Stephen" the protomartyr, with a book, and stones the emblems of his martyrdom; and over St. Domenick is "St. Thomas Aquinas," with book and the model of a church. Half-length figures, small life size, painted in tempera, on wood; each panel measuring 1 ft. 11 in. high by 1 ft. 4 in. wide, with circular top.

Third Stage, or *Cuspidi* (four pictures). Over the canopy of the Virgin, in the centre, are "The Archangel Michael," trampling on the Dragon, with a sword in his right hand and a pair of scales in the left; and St. Lucy with the palm of martyrdom in her right hand, and carrying her eyes in a plate, in her left. On the right of this centre group is "St. Jerome," in his cardinal robes and carrying the model of a church; on the left hand "St. Peter, Martyr," with the sword of his martyrdom on his head. Small full-length figures, painted in tempera, on wood, each 2 ft. 11 in. high by 10¼ in. wide; with circular tops.

The more important portions of this altar-piece formed an *Ancona* in the old church of San Domenico, in Ascoli. They are noticed by a traveller of the last century, who records their date, 1476.* The church of San Domenico was rebuilt in 1776, and Orsini† mentions some of the subjects as being in the sacristy in 1790. They afterwards came into the possession of the Cardinal Zelada, at Rome, who seems to have added the upper pictures, by the same master, and thus formed the present large altar-piece. It was seen by Seroux D'Agincourt, while in the collection of Cardinal Zelada, at Rome; and he has engraved the compartment of the Madonna and Child.‡ It was subsequently in the Rinuccini Collection, in Florence; from which it passed, in 1852, to that of Prince Anatole de Demidoff, and was placed in the private chapel in his villa of San Donato, near Florence, where it was put into its present magnificent frame.

Purchased at Paris, in May 1868, from Mr. G. H. Phillips, for 3,360 *l.*; numbered 788; but it cannot be exhibited, at present, from want of adequate space. The height of the whole altar-piece is 16 feet, the width 10 feet.

III. *John Singleton Copley*, R.A. (1737–1815).—"The Siege and Relief of Gibraltar;" a study for the large picture at Guildhall; painted for the Court of Common Council of the City of London. The incident represented is the repulse of the Spanish floating batteries; and the picture contains portraits of Lord Heathfield, Sir Robert Boyd, Sir William Green, and others; it has been engraved on a large scale by William Sharp. Painted in oil, on canvas; measure 4 ft. 4 in. high by 6 ft. 2 in. wide. Till lately in the possession of the painter's son, Lord Lyndhurst. Purchased from Mr. William Grist in July 1868, for 400 *l.*; numbered 787; hung in the Gallery at South Kensington in the month of September.

IV. *Michelangelo Buonarroti*, ascribed to (1475–1564).—Tuscan School. "The Entombment of our Lord;" an unfinished picture, partially, if not altogether, painted in tempera, on wood, 5 ft. 3¾ in. high by 4 ft. 11 in. wide. Composition of seven figures, small life size. St. John (or Nicodemus), Joseph of Arimathæa, and Mary Magdalen, are carrying the body of Christ, supported by a strap or twisted sheet, up a winding flight of steps to the tomb prepared by Joseph among some rocks in the background. On the spectator's left is a female figure, Salome, seated on the ground with her right arm raised as if examining something in her hand not expressed in the picture: on the opposite side are two other female figures, Mary, the wife of Cleophas, and the Virgin; the latter in obscure outline only, and kneeling on the ground.§

The

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* See Ricci, "Memorie Storiche della Arti, &c., delle Marca di Ancona." 1834. Vol. I., p. 211.
† "Descrizione, &c., della Città di Ascoli, 1790," p. 45.
‡ D'Agincourt, *Histoire de l'Art par ses Monumens*, &c., pl. 138. Paris, 1823.
§ See *John* xix. 25, 38, and *Mark* xv. 41.

The bare priming of the panel is left uncovered in several parts of the picture, especially in portions of costume. Several competent judges have pronounced this picture to be a work of Michelangelo's. Condivi and Vasari* mention, that Michelangelo left many unfinished works in painting as well as sculpture, and among such unrecorded labours may be accounted the present "Entombment." The work is evidently the design of a sculptor, and its date cannot be later than the end of the fifteenth century. It was in the Collection of Cardinal Fesch, and was stored with a vast number of other pictures in the basement of the Falconieri Palace at Rome, whence it was removed with others to the Villa Paolina, where, in 1845, it was sold by the Principe di Musignano to a Roman picture dealer, from whom, in 1846, it was bought by Mr. Robert Macpherson, with some other pictures, for a small sum; the surface of the picture being so obscured by dirt that its qualities were not apparent. When washed, it was inspected by several Roman connoisseurs and artists, and pronounced a work of great value. Peter Von Cornelius, the eminent German painter, in evidence in an action brought against the purchaser by the Roman dealer for its recovery, declared it to be "una cosa preziosa—un vero originale di Michelangelo."†

Purchased in London from Mr. Robert Macpherson, in August 1868, for 2,000 *l.* Protected with glass, numbered 790. It cannot be exhibited at present from want of space.

Appendix, No. 2.

List of Pictures which have been protected with Glass during the Year ending 31st December 1868.

Date.	Painter.	Subject.	Number in Catalogue.
March	Morando	Madonna and Child, &c.	777
„	Borgognone	Portraits	779
„	„	ditto	780
„	C. Landseer	Clarissa Harlowe	408
„	Bonington	Venice	374
„	Stothard	Woodland Dance	318
„	T. S. Good	The Newspaper	378
„	Lance	Fruit	443
„	Müller	Lycian Peasants	379
„	Stanfield	Battle of Trafalgar	405
„	Pollajuolo	Tobias and the Angel	781
April	Bouts	Exhumation of St. Hubert	783
October	Michelangelo	Entombment	790
„	H. W. Pickersgill	A Nun	791
December	Sir E. Landseer	Defeat of Comus	605

Total Number during the Year - - - - 15.

At the close of the year 1868, the total number of exhibited works of Foreign Schools protected with glass, was 130, including three cartoons and one tracing; of the British School, 95 pictures, and 202 frames of drawings and sketches. Total, 427.

* "Vita di Michelagnòlo Buonarroti," &c., Florence 1746. Folio No. 55. Vasari, "Vite, &c." Ed. Le Monnier, vol. 12, p. 213.

† R. P. D. Giannelli—"Romana Nullitatis contractus, super Merito et super examine Testium pro D. Vito Enei contra D. Robertum Macpherson." Romæ, 1856, p. 11.

Appendix, No. 3.

NUMBER of VISITORS to the NATIONAL GALLERY during the Year ending 31st December 1868.

Month.	Trafalgar Square.*	South Kensington.†
January	51,728	38,486
February	69,207	49,454
March	67,804	53,892
April	85,892	79,954
May	63,171	56,083
June	84,803	72,636
July	58,267	112,683
August	69,296	135,760
September	58,140	78,745
October	Closed	69,188
November	60,291	51,271
December	61,046	82,924
TOTAL	729,645	881,076

TOTAL for the Year - - - 1,610,721

Daily average at Trafalgar Square - - 3,840

* Open to the public four days in the week.

† Open to the public six days and three evenings in the week. The returns are those of the Museum generally.

Appendix, No. 4.

DETAILS relating to COPYING in the GALLERY.

Number of attendances during the year ending 31st December 1867:

Trafalgar Square - - - - - 5,893 (in 90 days).
South Kensington - - - - - 9,070 (in 146 days).

Number of Students in Oil-painting during the same period:

Entered in the books - - - - - - - 467

Daily average attendance:

Trafalgar Square - - - - - - - 35
South Kensington - - - - - - - 34

Number of Students in Water-colours during the same period:

New Students entered in the books - - - - 189

Daily average attendance:

Trafalgar Square - - - - - - - 30
South Kensington - - - - - - - 28

RETURN of PICTURES Copied in Oil during the Year.

Foreign Schools.			*British School.*		
Number of Copies.	Number of Pictures Copied.	Number of Masters.	Number of Copies.	Number of Pictures Copied.	Number of Masters.
109	44	31	147	67	27

PICTURES most frequently Copied during the same Period.

Foreign or Old Masters.

PAINTER.	SUBJECT.	Number in Gallery.	Times Copied.
Vandyck	Portrait, called Gevartius	52	12
Sassoferrato	Madonna in Prayer	200	9
Rembrandt	Portrait of an Old Lady	775	8
Velazquez	Portrait of Phillip IV.	745	6
Greuze	Head of a Girl	206	5
Paris Bordone	Portrait of a Lady	674	5
Correggio	Venus and Mercury	10	4
A. Del Sarto	His own Portrait	690	4
Raphael	Madonna and Child, &c.	744	4
Correggio	"Ecce Homo"	15	3
Murillo	St. John and the Lamb	176	3
Rembrandt	His own Portrait	672	3

Modern Masters.

PAINTER.	SUBJECT.	Number in Gallery.	Times Copied.
Stanfield	Zuyder Zee	404	8
Reynolds	Age of Innocence	307	6
Dubufe	The Surprise	457	6
Reynolds	Study of Heads	182	5
Leslie	Uncle Toby	403	5
Stanfield	Lake of Como	406	5
Herring	A Scanty Meal	452	5
Gainsborough	Cottage Children	311	4
Dyckmans	The Blind Beggar	600	4
Turner	The Old Temeraire	524	4
Ditto	Frosty Morning	492	3
Gainsborough	Mrs. Siddons	683	3
Callcott	Returning from Market	340	3
Ditto	Landscape with Cattle	342	3
Mulready	The Last in	393	3
Ditto	Crossing the Ford	395	3
Collins	Prawn Catchers	352	3
Newton	Yorick and the Grisette	353	3
Witherington	Stepping Stones	420	3
Linnell	Wood Cutters	438	3

Appendix, No. 5.

RETURN respecting CATALOGUES SOLD in the NATIONAL GALLERY during the Year ending 31st December 1868.

Foreign Schools.

		£.	s.	d.
Catalogues at 1*s.*	2,039	101	19	–
„ at 3*d.*	849	10	12	3

British School.

Catalogues at 1*s.*	504	25	4	–
TOTAL	3,392	£. 137	15	3

Appendix, No. 6.

STATEMENT of ACCOUNT relating to PURCHASE of PICTURES for the NATIONAL GALLERY during the Year ending 31st December 1868.

Dr.

1868:		£.	s.	d.
March	London:			
	Dierick Bouts	1,500	–	–
March 31	Balance surrendered at close of financial year	4,117	10	–
May	Paris:			
	Carlo Crivelli	3,360	–	–
	London:			
July	J. S. Copley	400	–	–
August	Michelangelo	2,000	–	–
December 31	Balance	4,240	–	–
	£.	15,617	10	–

Cr.

1868:		£.	s.	d.
January	Balance of Grant for 1867-8	5,617	10	–
April	Portion of Grant for 1868-9, for the purchase of Pictures according to Estimate	10,000	–	–
	£.	15,617	10	–

1 January 1869. By Balance - - - £. 4,240 – –

NATIONAL GALLERY.

ANNUAL REPORT of the DIRECTOR of the NATIONAL GALLERY to the Lords of the Treasury, for the Year ended 31st December 1868.

(Mr. Ayrton.)

Ordered, by The House of Commons, *to be Printed,*
16 *February* 1869.

Under 1 *oz.*

TWELFTH REPORT

OF THE

TRUSTEES

OF

THE NATIONAL PORTRAIT GALLERY

TO THE LORDS OF HER MAJESTY'S TREASURY.

1869.

The Trustees of the National Portrait Gallery have the honour to submit herewith their Twelfth Annual Report.

Under the operation of their bye-law, adopted in 1866, with the sanction of the Treasury, and more fully explained in their Report of 1867, as to the result of two years' non-attendance at any of their Meetings on the part of any one of the Trustees, the Marquess of Salisbury has now ceased to be a Member of this Board.

To supply this vacancy, a Treasury Minute, dated 27th March 1869, has appointed the Earl Cowper, K.G., a Trustee.

Accordingly, the names of the Trustees at the present time are as follows:—

The Earl Stanhope (Chairman).
William Smith, Esq. (Deputy Chairman).
The Lord President of the Council (for the time being).
The Earl Cowper, K.G.
The Earl Somers.
The Viscount Hardinge.
The Lord Stanley, M.P.
The Lord Bishop of Oxford.
The Right Honourable William Ewart Gladstone, M.P.
The Right Honourable Benjamin Disraeli, M.P.
Sir William Stirling Maxwell, Bart.
Sir Coutts Lindsay, Bart.
The Very Rev. the Dean of Westminster.
Sir Francis Grant, P.R.A.
Alexander Beresford Hope, Esq., M.P.

Since the day of the last Report (30th April 1868) up to the present day (inclusive), the number of meetings held by the Trustees is seven, and from the 9th of February 1857, when the Trustees commenced their duties, 99.

The list of 74 donations, as given in their former Reports, may now be continued, as follows:—

75. William Pitt, first Earl of Chatham, 1708—1778.
Painted by Richard Brompton (a repetition of the picture now at Chevening). Presented June 1868, by Earl Stanhope.

76. William, first Earl of Craven, 1606—1667.
Painted by Honthorst. Presented, December 1868, by the Earl of Craven.

77. Sir Henry R. Bishop, the musical composer, 1786—1855.
Painter unknown. Presented, February 1869, by Mrs. C. H. Smith.

The purchases made were stated by the Trustees in their former Report as amounting to 178. They are now increased, as the following list will show, to 203 :—

179. King George II., 1683—1760.
Painted at the age of 70, by Thomas Worlidge. Purchased April 1868. Price 10 *l.*

180. Thomas Babington, Lord Macaulay, 1800—1859.
A Bronze Medallion, modelled in 1848, by Baron Marochetti, R.A. Purchased May 1868. Price 27 *l.* 8 *s.* 6 *d.*

181. Richard Grenville, Earl Temple, K.G., 1711—1779.
Painted by William Hoare, of Bath. Purchased May 1868. Price 41 *l.* 1 *s.* 6 *d.*

182. Sir Thomas Lawrence, P.R.A., 1769—1830.
Painted by his pupil and assistant, Richard Evans. Purchased June 1868. Price 31 *l.* 10 *s.*

183. George Stephenson, 1781—1848.
A Marble Bust, sculptured in 1846, by Pitts. Purchased June 1868. Price 29 *l.* 13 *s.*

184. Oliver Plunkett, D.D., titular Archbishop of Armagh, 1629—1681.
Painted by G. Murphy. Purchased June 1868. Price 15 *l.* 15 *s.*

185. William Shenstone, the poet, 1714—1763.
Painted by Alcock. Purchased June 1868. Price 84 *l.*

186. Dr. Isaac Watts, 1674—1748.
Painted by Sir Godfrey Kneller. Purchased June 1868. Price 52 *l.* 10 *s.*

187. Dr. John Howe, M.A., domestic chaplain to Oliver Cromwell, 1630—1705.
Painter unknown. Purchased June 1868. Price 25 *l.*

188. Dr. Samuel Clarke, 1675—1729.
Probably painted by Vanderbank. Purchased July 1868. Price 54 *l.* 17 *s.*

189. The Children of King Charles I., A.D. 1637.
Painted in the school of Van Dyck. Purchased July 1868. Price 175 *l.* 10 *s.*

190. B. R. Haydon, historical painter, 1786—1846.
Painted by himself. Purchased July 1868. Price 10 *l.*

191. Professor Faraday, 1791—1867.
Painted in 1842, by T. Phillips, R.A. Purchased August 1868. Price 100 *l.*

192. John Wesley, M.A., 1703—1791.
A Marble Bust. Sculptor unknown. Purchased December 1868. Price 40 *l.*

193. King William III., 1650—1702.
Painted at the age of seven years, by Cornelius Jonson van Ceulen. Purchased December 1868. Price 40 *l.*

194. Prince James Edward Stuart, the Old Pretender, 1688—1766.
A Miniature, in oil, by A. S. Belle. Purchased December 1868. Price 15 *l.*

195. Edward Cocker, arithmetician and engraver, 1631—1674.
Painter unknown. Purchased December 1868. Price 7 *l.*

196. Frederick, Lord North, K.G., afterwards Earl of Guilford, 1732—1792.
Drawn in crayons by Nathaniel Dance. Purchased February 1869. Price 1 *l.* 10 *s.*

197. Dean Swift, 1667—1745.
Painted by Jervas. Purchased February 1869. Price 110 *l.* 5 *s.*

198. George Villiers, second Duke of Buckingham, K.G., 1627—1687.
Painted by Sir Peter Lely. Purchased February 1869. Price 88 *l.* 4 *s.*

199. Anne Brudenell, Countess of Shrewsbury. Died 1702.
Painted by Sir Peter Lely. Purchased February 1869. Price 110 *l.* 5 *s.*

200. Earl Cornwallis, 1738—1805.
Painted by Gainsborough. Purchased February 1869. Price 57 *l.* 6 *s.*

201. George Clifford, Earl of Cumberland, 1558—1605.
Painter unknown. Purchased March 1869. Price 5 *l.*

202. Joseph

202. Joseph Addison, 1672—1719.
Painted by Sir Godfrey Kneller. Purchased March 1869. Price 31 *l.* 10 *s.*

203. Right Honourable George Canning, 1770—1827.
A Marble Bust, sculptured by Chantrey in 1821. Purchased March 1869. Price 189 *l.* 5 *s.*

The total number of visitors to the Gallery during the year 1868 was 25,344, being 695 in excess of the previous year, and 678 in advance of the year 1866.

The total number of visitors to the Gallery since the time when it was first opened to the public is as follows :—

Year.	Visitors.	Year.	Visitors.
1859	5,305	1864	14,885
1860	6,392	1865	16,642
1861	10,907	1866	24,666
1862 (Exhibition year)	17,927	1867	24,649
1863	10,475	1868	25,344

Although the attendance of visitors during the first three months of the present year has greatly exceeded that of the corresponding period of 1868, the number of visitors during the Easter holidays was very small.

This, however, may be readily accounted for by the unusual severity of the weather: Easter Monday was, from first to last, a most inclement day, dark and cold with alternating rain and sleet. The visitors on that occasion amounted to only 594, and during the whole Easter week did not exceed 1,653.

On the day following Christmas day, in 1868, the number of visitors was 844, against 225 visitors of the preceding year.

In the first Report which the Trustees addressed to the Board of Treasury, dated May 5th, 1858, reference was made to the uncertain rate at which opportunities for making important purchases were likely to present themselves. On that occasion the Trustees pointed out that "there are years when the portraits that can be obtained by purchase are but few; while in another year, perhaps, a sale at some great country house, or a dispersion of some celebrated collection may call for a far greater than average expense. On this ground the Trustees think it most desirable that, while refraining from purchases that seem to them of less than ordinary interest, they may be able to reserve to themselves the means of profiting by any sudden and favourable opportunity for large acquisitions."

An opportunity of this nature has unexpectedly presented itself since the commencement of the present year, in the sale of pictures and valuable effects belonging to the late Marquess of Hastings.

The Trustees selected four pictures from a large number of historical portraits, as most desirable for the collection under their charge, and these four portraits were purchased through Messrs. Graves, at the price of 366 *l.*, even although, their funds being then almost exhausted, the purchase could not be completed until after the commencement of the new financial year.

In several of their previous Reports the Trustees have had occasion to lament the restricted and most inadequate space at their disposal, and the growing difficulty which they have found either to arrange and exhibit in any satisfactory manner the present pictures, or to find space for new. It is an evil which all successive administrations have been ready to admit, and which none of them have been able to redress.

Ever since the date of their last Report the Trustees have been in negotiation upon the subject, and have indulged the hope of obtaining some other temporary accommodation pending the construction of the permanent apartments designed for them in Trafalgar-square, nor do they even yet despair that the difficulties in the way may be surmounted.

Meanwhile, without imputing any blame to any person, it is their duty to state explicitly that they have no wall space remaining to suspend even one new picture, and that besides the general crowding of those already in their charge, and the enforced absence of any order or classification as to dates or subjects, some of these portraits are of necessity placed in such a light that they can scarcely be seen at all, and then only to the greatest disadvantage.

Signed, by Order of the Board,

George Scharf,
Secretary and Keeper.

29, Great George Street, Westminster,
29 April 1869.

NATIONAL PORTRAIT GALLERY.

TWELFTH REPORT

OF THE

TRUSTEES

OF THE

NATIONAL PORTRAIT GALLERY

TO THE

LORDS OF HER MAJESTY'S TREASURY.

(Presented to Parliament by Her Majesty's Command.)

Ordered, by The House of Commons, *to be Printed,*
4 *May* 1869.

189.

Under 1 *oz.*

STANDARDS COMMISSION.

SECOND REPORT

OF

THE COMMISSIONERS

APPOINTED TO INQUIRE INTO

THE CONDITION OF THE EXCHEQUER (NOW BOARD OF TRADE) STANDARDS.

ON THE QUESTION OF THE INTRODUCTION

OF THE

METRIC SYSTEM OF WEIGHTS AND MEASURES

INTO

THE UNITED KINGDOM.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1869.

[*Price* 1*s.* 6*d.*]

STANDARDS COMMISSION.

SECOND REPORT

OF

THE COMMISSIONERS

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ON THE QUESTION OF THE INTRODUCTION

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Presented to both Houses of Parliament by Command of Her Majesty.

REFORE
PALL MALL

LONDON:
PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1869.

4186

SECOND REPORT.

TO THE QUEEN'S MOST EXCELLENT MAJESTY.

MAY IT PLEASE YOUR MAJESTY,

WE, the Commissioners appointed under Your Majesty's Royal Warrant dated the Fourth day of May 1868, for inquiry into the condition of the Exchequer Standards (now called the Board of Trade Standards, or the Official Standards) of length and weight, and for other purposes therein set forth, acting under the directions to us contained in the said Warrant to report to Your Majesty from time to time the result of our inquiries, humbly offer to Your Majesty our Second Report.

1. In closing their First Report, submitted to Your Majesty under date of 24 July 1868, the Commission adverted to the Metric system, and especially to the probable effect of attempting to introduce it into this country. This subject appeared to enter legitimately into their consideration, inasmuch as the introduction of a new system would imply addition to the existing Board of Trade Standards, to which (among other things) the inquiries of the Commission are by Your Majesty's Royal Warrant specially directed. And the Commission expressed their sense of the great importance of the question, and undertook to give to it their early and careful attention.

2. In their desire to redeem this pledge, the Commission have thought it advantageous to confine themselves in this their Second Report to the questions connected with the Metric system, deferring to a later Report all allusion to the various points connected with the proceedings of the Standards Office, and with the British law and its administration, relating to the Imperial system of weights and measures.

3. It appears to the Commission that the reasons which may be urged for or against the introduction of a new system will naturally arrange themselves under two heads: namely, those which relate to the internal commercial transactions of the country; and those which relate to transactions with other countries. It is proposed here to consider the subject in that order.

4. With reference to the question as bearing upon internal commerce, the Commission have thought it desirable to examine into the reasons assigned for changes of system in other countries, and, if possible, to ascertain the results of their experience; and to inquire whether similar reasons apply, and what may be anticipated as the effect of change in this country.

5. As regards the first of these trains of inquiry, the Commission have derived most valuable information from official papers of other countries, transmitted either directly, or through the Board of Trade, to the Warden of the Standards, and by him communicated to the Commission. The information thus laid before them is appended to the Report. Among these documents, the most important are those of France, the United States of North America, North Germany, Switzerland, and India. As regards the second inquiry, the Commission have had before them the evidence collected by preceding Standards Commissions, and especially that which was heard by a Committee of the House of Commons in the year 1862; they have also had the results of their own personal experience, both in matters of science and in transactions of daily life.

6. The Commission remark that in the statements introductory to the proposals for new systems in France, North Germany, and India, very great stress is laid upon the discordance in the fundamental units of their customary weights and measures, as adopted in different districts of the same empire. These reasons have no force in Great Britain and Ireland, throughout which, whatever difference may prevail as to the multiples in local use, the fundamental units, namely, the yard, the pound, the gallon, are strictly the same; based upon national standards which are constructed with the utmost skill and care, and supported by a system of inspection which, though chargeable with imperfections,

(to which the Commission at present advert no further) is on the whole efficient. The Commission also remark that, in the introduction of the new system into Switzerland, it appears to have been rather the object of the proposers to define accurately the relation of their standard to the French standard, than to adopt the Metric system; thus, the Swiss foot is defined to be three-tenths of the metre, a proportion which seems to be irreconcileable with the practical adoption of a decimal scale.

7. On the results of the introduction of the Metric system, as matter of experience, it is difficult to give a certain statement. The great mass of people in France undoubtedly adopt it, both in the names and in the values of the weights, measures, and coins; although such names as the *livre* and the *sou*, for the half-kilogram and the piece of 5 centimes, are still in common use. In Holland and other neighbouring countries the Metric system, though very generally adopted, is, it is believed, still less perfectly introduced.

8. In the United Kingdom, so far as can be conjectured, the existing Imperial system has, in its main features, grown up spontaneously among the people, and the action of the Legislature has been limited to such practical measures as the following: the giving certainty and precision to the fundamental Standards, the establishment of accurate and more simple relations among systems which at first probably had no connexion, (as those of the *stone* and the *pound*), and, in some instances, the abolition of measures, &c. which, while bearing the same name, had slightly different values (as the various gallons). If this conjecture be correct, it tends to prove that the existing system meets the popular wants, and that it will not easily be expelled from popular use.

9. There is good reason to believe that in large factories a decimal division is frequently convenient, and in many cases, for commercial reasons, the most convenient base for that division is the Metric. The owners of those factories can, however, arrange such matters to a great extent, without legislative assistance. But for sales in shops, which specially require the care of the Legislature, and for ordinary work, other considerations apply. Different bases must be adopted, for instance, the yard is a very convenient length for drapers' measure, but the foot is far more convenient for carpenters' measure. It has been remarked that the last or coomb, the bushel, and the peck, are well suited for men's backs, arms, and hands. The natural inclination of the mind to halve and quarter continually exhibits itself in the subdivision of almost every base; thus, in avoirdupois weights and in measures of capacity, the progressive halving of the pound and bushel, and their lower denominations, is continued nine times, and the binary subdivision extends to $\frac{1}{512}$. The Metric system does not offer the same facility either for change of the adopted base, or for the continued binary subdivision; and any attempt to force it into use in shops, and into workmen's operations, and their accounts, would probably be felt as a needless grievance.

10. The Commission are obliged to remark here that the evidence as to the feeling of the great class of vendors in shops and ordinary tradesmen is rather of an inferential than of a positive character. Among the witnesses examined by the Committee of the House of Commons which sat in 1862, there is not one shopkeeper, and scarcely one person of the lower working class. The evidence collected by the preceding Standards Commissions cannot fairly be cited now, as the question of introducing the Metric system into this kingdom had then hardly been raised. But the Commission cannot omit to call attention to the distinct though negative fact, that not a single movement has been made on the part of shopkeepers or workmen for procuring a change, and not a single complaint has been made by them of the existing legal system of Imperial weights and measures.

11. It is obvious that in this country where the people are more accustomed to self-government than in other European countries, the executive has far less power of compelling obedience to the law in all the small transactions of trade, against the wishes of the public. Should an attempt be made at the present time to introduce the Metric system by legal compulsion, the Commission regard it as certain that very great confusion would be produced, and they think it highly probable that the attempt would be met by such an amount of resistance, active and passive, that it would totally fail.

12. At the same time, the Commission remark that the want of weights and measures on a decimal scale generally, or on the Metric scale specifically, is not unfrequently felt

by the manufacturing and trading classes, and more especially by men of science and by chemists and engineers of the highest class; and that it appears scarcely possible to satisfy this want, and to place the Metric system on the footing which it seems justly to claim, except by the legal establishment of Metric standards and of inspectors' standards (where required), and by the legal sanction of the use of Metric weights and measures in shops and in offices of conveyance. But such permission, unless very carefully guarded, would lead to the most intolerable and enduring confusion, and the Commission expressly state their opinion that any enactment giving permission to use Metric weights and measures for public sales and conveyance must be accompanied with such provisions for their form or other characteristics as will make it impossible to mistake them for weights and measures of the existing Imperial system. With very careful attention to these provisions, the Commission see no objection to the permissive introduction of weights and measures on the Metric system into shops and offices of conveyance, provision being also made for inspectors' standards and powers of inspection where required.

13. With the view of further lessening any confusion that might be occasioned by the addition of a new series of weights to those now existing of the Avoirdupois and Troy scales, the Commission have had under their consideration the question of the discontinuance of Troy weight. They refer to the opinions expressed by the Standards Commission of 1841 and 1854 in favour of the simplification of the British system of weights by the abolition of the Troy scale. Apothecaries weight based on Troy weight has since been legally discontinued under the authority of the Medical Act, 1858, and Avoirdupois weights have been substituted in the dispensing of medicines. Much of the difficulty of the discontinuance of Troy weight is thus removed, its use being now limited to manufacturers of and dealers in gold and silver wares and bullion. Still these form a numerous class, and the Commission feel that they cannot make any definite recommendation for abolishing Troy weight, without having first enquired extensively into the practice and feelings of persons who now use that system. The assay of the precious metals, the ascertaining the standard of gold and silver, the operations of coinage, and the levying the duty on gold and silver plate, all are now based by statute on Troy weight; and in the event of its abolition, it will become necessary to make further provision by law for the weights to be used for these purposes. It may also be a matter deserving consideration how far it may be expedient to substitute Metric weights. The Commission will give their careful attention to these points, and the results of their labours must be deferred to a future Report.

14. Passing now to the consideration of our transactions with foreign countries, the Commission express their full belief that the foreign commerce of this country, especially with France and with other countries which have introduced or propose to introduce the Metric system, has in late years increased much more rapidly than the home trade, though in what proportion it is difficult to ascertain. But, great as that foreign commerce undoubtedly has become, it is small in comparison with the home trade. From the report of the Postmaster-General in the year 1864, it appears that the number of foreign letters (requiring apparently to be doubled for proper comparison of the number of transactions) was about $\frac{1}{50}$ of the number of home letters. If we refer to the accessible returns relating to money transactions, the amount of stamp-duty levied on foreign bill-stamps, about 350,000*l.* annually, implies foreign transactions to the amount of about 600,000,000*l.*; while the amount of cheques and bills passed at the London Clearing House (in which many of the London bankers take no part) is about 3,300,000,000*l.*; and the transactions, in the manufacturing districts and the interior of the country generally multiply this in an unknown ratio. Still, the existence of this large foreign trade is an argument for the permissive adoption of the system which agrees with that of so many of our foreign trade correspondents. And great advantage will evidently be introduced, unaccompanied (so far as can be remarked) with any bad effects, by giving the ordinary statistical publications relating to foreign trade, and in some instances to home trade also, on the Metric as well as on the Imperial system.

15. As bearing upon all parts of this inquiry, the Commission think it their duty to call attention to the advantage of establishing in this country a decimal system of coinage. The decimal division gives the greatest facilities for the gradation of prices, and for the great number of additions, multiplications, and divisions continually presenting themselves in money affairs, but more rarely occurring in the combination of the several denominations of weights and measures. And the Commission think it probable that extensive familiarity with decimal coinage would materially tend to facilitate the introduc-

tion of a decimal scale of weights and measures, where it can be useful. The Commission do not disguise their apprehension that a change of coinage would produce for a time some confusion. At the same time they observe that it is absolutely in the power of the Government to effect the change without any risk that the resistance which might be made by those who preferred the old system could ultimately prevail against it.

16. Guided by the preceding considerations, the Commission have unanimously agreed upon the following resolutions,—

(1.) Considering the information which has been laid before the Commission,—

Of the great increase during late years of international communication, especially in relation to trade and commerce;

Of the general adoption of the Metric system of weights and measures in many countries, both in Europe and other parts of the world, and more recently in the North German Confederation and in the United States of America;

Of the progress of public opinion in this country in favour of the Metric system as a uniform international system of weights and measures;

And of the increasing use of the Metric system in scientific researches, and in the practice of accurate chemistry and engineering construction;

We are of opinion that the time has now arrived when the law should provide, and facilities be afforded by the Government, for the introduction and use of Metric weights and measures in the United Kingdom.

That for this object, Metric standards, accurately verified in relation to the primary Metric standards at Paris, and deposited in the Standards Department of the Board of Trade, should be legalized; and that verified copies of the official Metric standards should be provided by the local authorities for inspectors of such districts as may require them.

(2.) Considering the advantages of adopting in an international system not only of uniform weights and measures, but also uniform names; and that although there may be well founded objections to the inconvenient length and occasional similarity, both to the eye and ear of the French nomenclature, yet it is probable that these names will become familiar by custom, and obtain popular abbreviations;

We think that the French nomenclature, as well as decimal scale of the Metric system should be introduced in this country.

(3.) Considering,—

That there is no immediate cause requiring a general change in the existing system of legal weights and measures of the country for the purposes of internal trade;

That the statutable values of the fundamental imperial units are adopted in use without the slightest variation throughout the whole of the British Isles;

That the primary Imperial standards are as perfect as can be made by modern skill and science, and that the whole series of official standards are now most accurately verified in relation to the primary standards;

That a very large number of copies of the official Imperial standards, accurately verified, are now in use by the local inspectors of weights and measures;

That it is estimated there are nearly 30 millions of ordinary weights and measures of the existing Imperial system now in common use;

That at the present time there is no evidence to show that any considerable portion of traders and their customers in this country are dissatisfied with the Imperial system now in use, or that they desire to substitute the Metric system for it;

We are of opinion that the general introduction of the Metric system should be permissive only, and not made compulsory by law after any period to be now specified, so far as relates to the use of Metric weights and measures for weighing and measuring goods for sale or conveyance.

(4.) Considering that during the concurrent use of the Metric and Imperial systems, it will be expedient to prevent as far as possible Imperial and Metric weights and measures from being accidentally or fraudulently substituted for each other;

We are of opinion that authoritative regulations should be established under which each series may be readily and easily distinguished, by the adoption of conspicuous distinctive forms or marks for the several weights and measures, and by such other mode as may be determined upon after due inquiry.

(5.) We are of opinion that it is expedient that customs duties should be allowed to be levied by Metric weight and measure, as well by Imperial weight and measure; that the use of the Metric system, concurrently with the Imperial system, should be adopted by other public departments, especially the Post Office, and in the publication of the principal results of the statistics of the Board of Trade, as well as for the admeasurement and registration of the tonnage of shipping;

(6.) And that mural standards of the Metric system, as well as of the Imperial system, be exhibited in public places.

(7.) Considering,—

That the Metric system, as adopted in other countries, includes the relation of coinage to weights and measures, particularly in its uniform decimal scale;

And that the advantages of the introduction of the Metric system into this country, as an international system of weights and measures, would be much increased by establishing a corresponding international system of coinage, in regard to a unit and to a decimal scale;

We are of opinion that, even if the difficulties of establishing an international unit of coinage cannot be at present overcome, yet the decimalization of our system of coinage, which is in the power of the Government, would be very useful to the public.

(8.) Considering the great national importance of the question of the introduction of the Metric system of weights and measures into this country,—

It appears to us essential that any measure for this object should be proposed to Parliament by the Executive Government.

(9.) Considering that the Commission will very shortly enter upon the questions referred to them relating to the system of local inspection of weights and measures throughout the United Kingdom,—

We are of opinion that it is expedient that no legislation should take place with respect to the Metric system until the whole subject of the weights and measures of this kingdom be brought before Parliament in one Bill.

All which we humbly submit to Your Majesty.

G. B. AIRY, Chairman.
COLCHESTER.
STEPHEN CAVE.
JOHN GEORGE SHAW LEFEVRE.
EDWARD SABINE.
THOMAS GRAHAM.
W. H. MILLER.
H. W. CHISHOLM.

7, Old Palace Yard,
3 April 1869.

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APPENDIX I.

MEMORANDUM by the ASTRONOMER ROYAL, for the consideration of the Commission of Standards, regarding the POLICY of introducing into the STANDARD OFFICE STANDARDS connected with the METRIC SYSTEM.

IT appears not improbable that the Commission on Standards may be required, either in the discharge of their ordinary duties or in reply to a specific inquiry of Her Majesty's Government, to state their opinion on the propriety of giving legal validity to some Standard of the Metre, or to other standards connected with the Metric system, deposited at the Standard Office. It will be well that the members of the Commission be prepared for such a contingency; and, with the view of facilitating discussion on it within the Commission, I take leave to place before them the principal ideas occurring to me which seem to bear on the general question.

The subject may perhaps be properly considered in three different bearings: as affecting science; as affecting commercial transactions with other nations; and as affecting commercial transactions within our own nation.

With reference to the bearing of the matter on science, I do not think that the question of a certified standard needs to be raised; not because a scientific standard is unimportant, but because men of science require moral and not legal evidence, and will be satisfied with the authority of any standard of which the derivation and subsequent custody are known from communications such as are usual between learned societies and men of science.

With reference to the commercial value of an authorized Exchequer standard on the Metric system, it is important to consider the present state of the British law. Contracts made in terms of the Metric system are legal; the values of the Metric units being ascertained, not by reference to an Exchequer standard, but by a table of proportions of these units to the units of British measure, of which there are Exchequer standards.

As affecting transactions with foreigners, this system leaves nothing to be desired. Contracts with foreigners are always on a large scale, and the verification of such contracts by means of the British standards is as easy as by means of the standards of the foreign country (Metric or otherwise). If it is required to verify a contract for 1,000 metres of French silk, it is only necessary for the merchant to refer to the table hung on the wall or desk of the counting-house, and he will at once see the number of yards, admitting of verification by a legal standard, which ought to be represented in the measure of the silk furnished to him.

As affecting domestic transactions, the considerations are of a different class. If the use of the Metre standard, as a material measure and not a tabular equivalent, be in any way made legal, it will be in the power of a single person here and there to require that all tradesmen with whom he may deal do verify their asserted measures by exhibition of and reference to a material Metric standard. And, in a district where not one inhabitant in ten thousand cares about Metric system, a troublesome person may compel many tradesmen to keep, by the side of the yard measure of 36 inches, a Metre measure of $39\frac{3}{8}$ inches. The evils of a double standard must be great under any circumstances, but in no case can they be so great as when the two standards are sufficiently near to be occasionally confounded, and sufficiently different to alter every price by nine per cent. It would be a very great misfortune for the country to be exposed to such an inconvenience.

My opinion is, therefore, distinct, that no step ought to be taken which can tend in any way to introduce material standards on the Metric or any other foreign system.

Should the Commission decide on making the Standard Office a depository for standards of scientific or commercial value as distinguished from legal validity, then it would be proper that Metric standards of the highest accuracy should be placed there. With these ought to be associated the Prussian standards (based on the Prussian foot), the Austrian standards (based on the klafter), and any others whose importance may seem to demand material exhibition in the British Standard Office.

G. B. AIRY.

1867, January 1.

APPENDIX II.

On the Law and Practice of the Metric System of Weights and Measures in France; including the Construction, Verification, and Inspection of Metric Weights and Measures, and the Official Instructions relating to them; together with a Description of the primary Metric Standards, the Metre and the Kilogram, and their principal Official Copies, the Mode and Periods of their Verification.

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Introduction.

At the present time when the periodical comparison and verification of the principal copies of the imperial standards, as well as of the official standards of weights and measures in Great Britain, has for the first time been provided for and directed by statute, and is now being proceeded with in the Standards Department, under the superintendence and sanction of the Standards Commission, it may be both interesting and instructive to ascertain what course has been pursued in France with respect to the reverification, from time to time, of the official Metric standards, and more particularly as to the periods of reverification, the actual mode of comparison, and the results of the several comparisons made.

With the view also of laying before the Standards Commission a full statement of the law and practice of the French Metric system, it may be desirable, at the same time, to extend the inquiry into the whole system adopted in France with respect to the local Metric standards, and the commercial weights and measures established by law; their construction, verification, and inspection, and the official instructions and regulations relating to them; together with the penalties for offences against the laws and regulations in regard to these Metric weights and measures.

It may be the more desirable to lay before the Commission a full and detailed statement of the mode in which the Metric system of weights and measures has been established and is now administered in France, not only that it may be distinctly known what their system actually is, for the introduction of which into the United Kingdom such strenuous efforts are made, and a bill for this object having been introduced this session into the House of Commons, but that this information may also furnish suggestions for the much needed improvement in our own system of local inspection of weights and measures.

With reference, however, to this last-mentioned object, the wide difference that exists between the principles of administrative government in this constitutional kingdom, and in the more despotic empire of France, should be borne in mind,—between the principle of self-government in the one country, and that of centralization in the other. The principle of centralization has indeed been so completely and systematically established in France, as to constitute what has been described* as "a central authority "armed and equipped at all points with irresistible "power." It may be instructive to observe the very slow progress made in France, notwithstanding this powerful machinery of centralization, in the compulsory substitution of the Metric system for the old system of weights and measures, under the provisions of the law of 1795, and during the succeeding 42 years; and also the very stringent provisions of the law of 1837, and of the official regulations in pursuance of this law, which were consequently rendered necessary in order to accelerate this progress, and practically to establish the Metric system in France.

The requisite information has been derived from the French official statements printed and issued from time to time. First, as regards the original construction and verification of the primary Metric standards, the metre and the kilogramme, and their copies intended as the official standards, a full and detailed account is contained in the "*Base du Système Métrique.*" The details of subsequent verifications of the official Metric standards are to be found in the several official reports, termed "*Procès-verbal des operations,*" &c. drawn up and signed by the public officers who were responsible for the execution of these duties.

For the purpose, however, of obtaining the most complete and authentic information upon the subject of the law and practice of the French Metric system, as well as the existing system of construction, verification, and inspection of the ordinary French weights and measures, the Warden of the Standards, on 2nd December 1867, addressed a letter, in which he requested to be furnished with official information upon these points, to General Morin, the Director of the Conservatoire des Arts et Métiers at Paris, under whose direction the service of French weights and measures is placed, and who was president of the Commission appointed in 1863 for the official verification of the primary Metric standards of the Archives and of the Conservatoire. In his reply, dated 17th December 1867 (a copy of which will be found at page 88), General Morin referred to the official verification of the French standards in 1864, and transmitted a printed copy of the procès-verbal of the comparison then made. He also transmitted a printed official copy of the laws and regulations, and of the ministerial instructions for the construction, verification, and inspection of weights and measures in France, which contains the fullest and most detailed information upon the subject. The book is entitled, "*Recueil Officiel des Lois, Ordonnances, Décrets, et Instructions publiés sur la Fabrication et la Vérification des Poids et Mesures,*" &c., printed at Paris, 1862. It does not appear to have been published, as no publisher's name is attached to it.

The following published books have also furnished information upon the subjects of this paper :—

Instruction sur les mesures déduites de la grandeur de la Terre par la Commission temporaire des Poids et Mesures républicaines, en execution des Décrets de la Convention Nationale. Paris, an 11, de la Republique.

Traité de Météorologie, par M. Saigey. Paris, 1834.

La Pratique des Poids et Mesures du Système Métrique, par M. Saigey. Ouvrage autorisé par le Conseil Royal de l'Instruction publique. Paris, 1841; and a later edition of 1856.

Manuel populaire des Poids et Mesures, &c., par L. Daléchamps. Ouvrage adopté par le Ministre de la Guerre. Paris (no date).

Manuel pour la Publication des Poids et Mesures, par M. Ravon, Vérificateur au Bureau Central des Poids et Mesures. Paris, 1843.

Manuel complet des Poids et Mesures, et de la Vérification, par M. Tarbé. Publié avec l'approbation de M. le Ministre de l'Agriculture et de Commerce. Paris, 1845.

Traité historique des Poids et Mesures, et de la Vérification, par M. A. Barny, Vérificateur-en-chef des Poids et Mesures. Paris, 1863.

Cours de Code Pénal, par M. A. Bertauld. Paris, 1854.

Populäre Vorlesungen über wissenschaftliche Gegenstände, von F. W. Bessel. Herausgegeben von H. C. Schumacher. Hamburg, 1848.

Ueber das Bergkrystall-Kilogram, &c., von Dr. C. A. Steinheil (Abhandlungen der K. Akademie der Wissenschaften zu München, B. 4, S. 165).

Rapport sur les Comparaisons qui ont été faites à Paris en 1859 et 1860 de plusieurs Kilogrammes, &c., par MM. Regnault, Morin, et Brix. Publié par ordre du Gouvernement Prussien. Berlin, 1861.

Schreiben des Professors Herrn Dr. Karsten, zu Kiel (Remarks upon the preceding Report).

Establishment of the Metric System in France.

Defective state of the old weights and measures of France.

Amongst the many well-founded grievances of the French people, for which they sought redress, and which led to the French revolution towards the close of the last century, were the defective state and want of uniformity of their weights and measures (*l'étonnante et scandaleuse diversité de nos mesures*), causing continual impediments in the transactions of business, and affording the means of fraud in dealings with the public. The weights and measures, though nominally the same, varied in each province, and frequently also in many localities of the same province. There were more than 50 different pounds (*livres*); there were

* Edinb. Rev. Oct. 1867, Art. Napol. Corresp.

hundreds of different superficial measures of land; a great variety of tons for wine and other drinkables. In some places the length of the ell (*aune*) varied according to the textile fabric measured, and the weight of the pound according to the commodity sold.*

Preliminary steps taken in 1790.

The attention of the Government, as well as of several *savans* in Paris, was drawn to the subject, in consequence of numerous memorials presented by deputies to the States General convoked in 1789, and the necessity of dealing with it was felt when the National Assembly, by a decree of 15th March 1790, abolished all the feudal rights, including all those relating to the local regulation of weights and measures. M. de Talleyrand was selected to prepare a report upon the subject. In this report he stated :—†

Report of M. de Talleyrand.

" L'innombrable variété de nos poids et de nos mesures et leurs dénominations bizares jettent, nécessairement, de la confusion dans les idées, de l'embarras dans le commerce ; mais ce qui, particulièrement, doit être une source d'erreurs et d'infidelités, c'est moins encore cette diversité en elle même, que la différence des choses sous l'uniformité de nom. Une telle bigarure, qui est un piége de tous les instants pour la bonne foi, est bien plus commune qu'on ne le pense, puisque, même sous les noms auxquels l'usage semble le plus avoir attaché l'idée d'une mesure fixe, tels que le pied, l'aune, etc., il existe une foule de différences très réelles. Rien ne saurait justifier un tel abus ; il était réservé à l'Assemblée Nationale de l'anéantir."

After referring to the advantages that would result to the landed interest, to industry, and to the whole community from establishing uniformity in weights and measures, and after indicating differing systems based upon a natural unit as invariable as nature herself, M. de Talleyrand proposed to the National Assembly to communicate with the British Parliament, with the view of obtaining their concurrence in this object, and in the appointment of Commissioners to be chosen, in equal number, from the Academy of Sciences at Paris and the Royal Society at London, to determine a natural unit of weights and measures. He added :—

" Chacune des deux nations formerait sur cette mesure ses étalons, qu'elle conserverait avec le plus grand soin ; de telle sorte que si, au bout de plusieurs siècles, on s'apercevait de quelques variations dans l'année sidérale, les étalons pussent servir à l'évaluer, et, par là, à rattacher ce point important du système du monde à une grande époque, celle de l'Assemblée Nationale. Peut-être même est-il permis de voir dans ce concours de deux nations interrogeant ensemble la nature pour en obtenir un résultat important, le principe d'une union politique, opérée par l'entremise des sciences. Cette vue ne peut échapper à des legislateurs, et mérite, sans doute, une haute considération de leur part."

Decree of National Assembly, 8 May 1790.

The first decided step taken in France for improving the ancient system of weights and measures, and which eventually led to the establishment of the Metric system, was consequent upon this Report of M. de Talleyrand. This step was the issue of a decree of the National Assembly, dated 8th May 1790, and having for its object the determination of a natural standard unit for the basis of the new system, as recommended in the Report. A copy of this decree is given in M. Chevalier's evidence before the Committee on Weights and Measures in 1862 (Q. 565). It may be noticed that the decree refers only to an uniform International Standard, to be agreed upon by England and France, and to be derived from the pendulum. No mention is made of a standard of length to be derived from an arc of the meridian, or of a Metric or decimal system. The English Government making no response to the appeal made to them, the subject was referred by the National Assembly to a commission of members of the French Academy, upon whose recommendation the ten-millionth part of the quadrant of the meridian was fixed upon, by the decree of 26th March 1791, as the unit and base of the new system.

The text of the law of 26th March 1791 was as follows :—

Law Ma- on t of t mir unit base new

" L'Assemblée Nationale, considérant que, pour parvenir à établir l'uniformité des poids et mesures, conformément à son décret du 8 mai, 1790, il est nécessaire de fixer une unité de mesure naturelle et invariable, et que le seul moyen d'étendre cette uniformité aux nations étrangères et de les engager à convenir d'un même système de mesure, est de choisir une unité qui, dans sa determination, ne renferme rien ni d'arbitraire ni de particulier à la situation d'aucun peuple sur le globe ; considérant de plus que l'unité proposée dans l'avis de l'Académie des Sciences, du 19 mars de cette année, réunit toutes ces conditions, a décrété et décrète qu'elle adopte la grandeur du quart du méridien terrestre pour base du nouveau système de mesures ; qu'en conséquence, les opérations nécessaires pour déterminer cette base, telles qu'elles sont indiquées dans l'avis de l'Académie, et notamment la mesure d'un arc du méridien depuis Dunkerque jusqu'a Barcelonne, seront incessamment exécutées ; qu'en conséquence, le Roi chargera l'Académie des Sciences de nommer des commissaires qui s'occuperont sans délai de ces opérations, et se concertera avec l'Espagne pour celles qui doivent être faites sur son territoire."

The question was debated by the French Commission* whether the reform of their weights and measures should not be accompanied by a change in the system of arithmetical notation by substituting a duodecimal for the decimal scale. The superior advantages of the duodecimal scale were stated and admitted by them, particularly as applicable to weights and measures. But they were alarmed at the practical difficulties of carrying out so great a change, which involved the addition of two cyphers to represent the numbers 10 and 11, and the substitution of duodecimal for decimal multiples, as well as the opposition it would be certain to meet with, not only in France but more particularly in foreign countries, and they decided that it would be fatal to the adoption of their new system of weights and measures. On the other hand, they considered that nothing would so much facilitate its adoption as the use of the decimal scale universally used in arithmetical notation, and they recommended it accordingly.

Law gust deter the u the b a dec scale.

A further decree of 1 August 1793 determined that the fundamental base of the new system of weights and measures was to be called the *mètre*, and that the Metric system, with a decimal scale of division, should be adopted uniformly throughout the republic, from 1 July 1794. Provisions were contained in this law for the construction of the new standards, and for providing copies in all departmental districts. But the construction of the new standards not being completed, the commencement of the new system was further postponed by the law of 7 April 1795.

The following was the text of this law :—

" *Décret du* 1^er^ *Août* 1793.

" La Convention Nationale, convaincue que l'uniformité des poids et mesures est un des plus grands bienfaits qu'elle puisse offrir aux citoyens français :

" Après avoir entendu le rapport de son comité d'instruction publique sur les opérations qui ont été faites par l'Académie des Sciences, d'après le décret du 8 mai 1790.

" Déclare qu'elle est satisfaite du travail qui a déjà été exécuté par l'Académie des Sciences sur le système des poids et mesures ; qu'elle en adopte les résultats pour établir ce système dans toute la France, sous la nomenclature du tableau annexé à la présente loi, et pour *l'offrir à toutes les nations :*

" En consequence, la Convention décrète ce qui suit :—

" Art. 1^er^.—Le nouveau système des poids et

* Saigey's Pratique de Poids et Mesures, 1856, p. 110, &c.
† Barny, p. 30.

* Instruction sur les Mesures déduites de la Grandeur de la Terre. Discours Préliminaire, p. xiv

mesures, fondé sur la mesure du méridien de la terre et la division décimale, servira uniformément dans toute la France.

" Art. 2.—Néanmoins, pour laisser à tous les citoyens le temps de prendre connaissance de ces nouvelles mesures, les dispositions de l'article précédent ne seront obligatoires qu'au 1er juillet 1794, les citoyens sont seulement invités d'en faire usage avant cette époque.

" Art. 3—Il sera fait, par des artistes au choix de l'Académie des Sciences, des étalons des nouveaux poids et mesures, qui seront envoyés à toutes les administrations de département et de district.

" Art. 4.—L'Académie des Sciences nommera quatre commissaires pris dans son sein, et le comité d'instruction publique en nommera deux pour surveiller la construction des étalons ; ils en constateront l'éxactitude et signeront les instructions destinées à accompagner les envois qui seront faits par le Ministre de l'Intérieur.

" Art. 5.—L'Académie des Sciences enverra au comité d'instruction publique un devis estimatif des frais qu'exigera la construction des étalons, pour que la Convention en puisse décréter les fonds nécessaires.

" Art. 6.—Les étalons seront conservés avec le plus grand soin dans un lieu destiné à cet objet, dont la clef restera entre les mains d'un des commissaires de chaque corps administratif.

" Art. 7.—Afin d'empêcher la dégradation des étalons, les corps administratifs nommeront, dans chaque chef-lieu de département ou de district, une personne éclairée pour assister à la communication que les artistes prendront de ces étalons, dans la vue de construire des instruments de mesures et de poids à l'usage des citoyens.

" Art. 8.—Dès que les nouveaux étalons seront parvenus aux administrations de district, toutes les municipalités de chaque district, seront tenues de faire construire des instruments de mesures et de poids qui resteront déposés à la maison commune.

" Art. 9.—Le recueil des différents mémoires rédigés jusqu'à présent par les commissaires de l'Académie, qui comprend les détails des opérations faites pour parvenir au nouveau système des poids et mesures, sera imprimé et accompagnera l'envoi des étalons.

" Art. 10.—La Convention charge l'Académie de la composition d'un livre à l'usage de tous les citoyens, contenant des instructions simples sur la manière de se servir des nouveaux poids et mesures, et sur la pratique des opérations arithmétiques relatives à la division décimale.

" Art. 11.—Des instructions sur les nouvelles mesures et leurs rapports aux anciennes les plus généralement répandues, entreront dans les livres élémentaires d'arithmétique qui seront composés pour les écoles nationales."

The new Metric system was definitively established by the law of 18 Germinal, An III. (7 April 1795), when the construction or importation of any new weights and measures of the former system was prohibited. The text of this law, the provisions of which are still in force and regulate the Metric system in France, is as follows :—

Loi du 18 *Germinal, An III.*

" La Convention, voulant assurer au peuple français le bienfait des poids et mesures uniformes et invariables précédemment décrétés, et prendre les moyens les plus efficaces pour en faciliter l'introduction dans toute la France, après avoir entendu le rapport de son comité d'instruction publique, décrète ce qui suit :

" Art. 1er.—L'époque prescrite par le décret du 1er août 1793 pour l'usage des nouveaux poids et mesures, est prorogée, quant à la disposition obligatoire, jusqu'à ce que la Convention y ait statué de nouveau, en raison des progrès de la fabrication : les citoyens sont cependant invités de donner une preuve de leur attachement à l'unité et à l'indivisibilité de la République, en se servant, dès à présent, des nouvelles mesures dans leurs calculs et transactions commerciales

" Art. 2.—Il n'y aura qu'un seul étalon des poids et mesures pour toute la France ; ce sera une règle de platine sur laquelle sera tracé le mètre qui a été adopté pour l'unité fondamentale de tout le système des mesures.

" Cet étalon sera exécuté avec la plus grande précision, d'après les expériences et observations des commissaires chargés de sa détermination, et il sera déposé près du Corps Législatif, ainsi que le procès-verbal des opérations qui auront servi à le déterminer, afin qu'on puisse les vérifier dans tous les temps.

" Art. 3.—Il sera envoyé dans chaque chef-lieu de district un modèle conforme à l'étalon prototype dont il vient d'être parlé, et, en outre, un modèle de poids exactement déduit du système des nouvelles mesures. Ces modèles serviront à la fabrication de toutes les sortes de mesures employées aux usages des citoyens.

" Art. 4.—L'extrême précision qui sera donnée à l'étalon en platine ne pouvant pas influer sur l'exactitude des mesures usuelles, ces mesures continueront d'être fabriquées d'après la longueur du mètre adoptée par les décrets antérieurs.

" Art. 5.—Les nouvelles mesures seront distinguées dorénavant par le surnom de *Républicaines*, leur nomenclature est définitivement arrêtée comme il suit :

" On appellera :

" *Mètre*, la mesure de longueur égale à la dix millionième partie de l'arc du méridien terrestre compris entre le pôle boréal et l'équateur ;

" *Are*, la mesure de superficie pour les terrains, égale à un carré de dix mètres de côté ;

" *Stère*, la mesure destinée particulièrement au bois de chauffage, et qui sera égale au mètre cube ;

" *Litre*, la mesure de capacité, tant pour les liquides que pour les matières sèches, dont la contenance sera celle du cube de la dixième partie du mètre ;

" *Gramme*, le poids absolu d'un volume d'eau pure, égal au cube de la centième partie du mètre, et à la température de la glace fondante ;

" Enfin, l'unité des monnaies prendra le nom de *Franc* pour remplacer celui de *Livre* usité jusqu'aujourd'hui.

" Art. 6.—La dixième partie du mètre se nommera *décimètre*, et sa centième partie *centimètre ;*

" On appellera *décamètre* une mesure égale à dix mètres, ce qui fournit une mesure très-commode pour l'arpentage ;

" *Hectomètre* signifiera une longueur de cent mètres ;

" Enfin, *kilomètre* et *myriamètre* seront des longueurs de mille et dix mille mètres, et désigneront principalement les distances itinéraires.

" Art. 7.—Les dénominations des mesures des autres genres seront déterminées d'après les mêmes principes que celles de l'article précédent.

" Ainsi, *décilitre* sera une mesure de capacité dix fois plus petite que le litre ; *centigramme* sera la centième partie du poids d'un gramme.

" On dira de même *décalitre* pour désigner une mesure contenant dix litres ; *hectolitre* pour une mesure égale à cent litres ; un *kilogramme* sera un poids de mille grammes.

" On composera d'une manière analogue les noms de toutes les autres mesures.

" Cependant lorsqu'on voudra exprimer les dixièmes ou les centièmes d'un franc, unité des monnaies, on se servira des mots *décime* et *centime*, déjà reçus en vertu des décrets antérieurs.

" Art. 8.—Dans les poids et les mesures de capacité, chacune des mesures décimales de ces deux genres aura son double et sa moitié, afin de donner à la vente des divers objets toute la commodité que l'on peut désirer ; il y aura donc le *double litre* et le *demi-litre ;* le *double hectogramme* et le *demi-hectogramme*, et ainsi des autres.

" Art. 9.—Pour rendre le remplacement des anciennes mesures plus facile et moins dispendieux, il sera exécuté par parties et à différentes époques. Ces époques seront décrétées par la Convention Nationale, aussitôt que les mesures républicaines se trouveront fabriquées en quantités suffisantes, et que tout ce qui

tient à l'exécution de ces changements aura été disposé. Le nouveau système sera d'abord introduit dans les assignats et monnaies, ensuite dans les mesures linéaires ou de longueur, et progressivement étendu à toutes les autres.

" Art. 10.—Les opérations relatives à la détermination de l'unité des mesures de longueur et de poids, déduites de la grandeur de la terre, commencées par l'Académie des Sciences, et suivies par la commission temporaire des mesures, en conséquence des décrets des 8 mai 1790 et 1er août 1793, seront continuées, jusqu'à leur entier achèvement, par des commissaires particuliers, choisis principalement parmi les savants qui y ont concouru jusqu'à présent, et dont la liste sera arrêtée par le comité d'instruction publique. Au moyen de ces dispositions, l'administration dite commission temporaire des poids et mesures, est supprimée.

" Art. 11.—Il sera formé, en remplacement, une agence temporaire, composée de trois membres, et qui sera chargée, sous l'autorité de la commission d'instruction publique, de tout ce qui concerne le renouvellement des poids et mesures, sauf les opérations confiées aux commissaires particuliers, dont il est question dans l'article précédent.

" Les membres de cette agence seront nommés par la Convention Nationale, sur la proposition de son comité d'instruction publique. Leur traitement sera réglé par ce comité, en se concertant avec celui des finances.

" Art. 12.—Les fonctions principales de l'agence temporaire seront,—

" 1°. De rechercher et employer les moyens les plus propres à faciliter la fabrication des nouveaux poids et mesures pour les usages de tous les citoyens ;

" 2°. De pourvoir à la confection et à l'envoi des modèles qui doivent servir à la vérification des mesures dans chaque district ;

" 3°. De faire composer ou répandre les instructions convenables pour apprendre à connaître les nouvelles mesures et leurs rapports avec les anciennes ;

" 4°. De s'occuper des dispositions qui deviendraient nécessaires pour régler l'usage des mesures républicaines et de les soumettre au comité d'instruction publique, qui en fera rapport à la Convention Nationale ;

" 5°. D'arrêter les états de dépenses de toutes les opérations qu'exigeront la détermination et l'établissement des nouvelles mesures, afin que ces dépenses puissent être acquittées par la commission d'instruction publique ;

" 6°. Enfin de correspondre avec les autorités constituées et les citoyens dans toute la République sur tout ce qui sera utile pour hâter le renouvellement des poids et mesures.

" Art. 13.—La fabrication des mesures républicaines sera faite autant que possible par des machines, afin de réunir à l'exactitude, la facilité et la célérité dans les procédés, et par conséquent de rendre l'achat des mesures d'un prix médiocre pour les citoyens.

" Art. 14.—L'agence temporaire favorisera la recherche des machines les plus avantageuses ; elle en commandera, s'il en est besoin, aux artistes les plus habiles, ou les proposera au concours, suivant les circonstances. Elle pourra aussi accorder des encouragements en avances, matières ou machines, aux entrepreneurs qui prendraient des engagements convenables pour quelque partie importante de la fabrication des nouveaux poids et mesures, mais, dans tous les cas, l'agence sera tenue de prendre l'autorisation du comité d'instruction publique.

" Art. 15.—L'agence temporaire déterminera les formes des différentes sortes de mesures, ainsi que les matières dont elles devront être faites, de manière que leur usage soit le plus avantageux possible.

" Art. 16.—Il sera gravé sur chacune de ces mesures leur nom particulier, elles seront, en outre, marquées du poinçon de la République qui en garantit l'exactitude.

" Art. 17.—Il y aura, à cet effet, dans chaque district, des vérificateurs chargés de l'apposition du poinçon. La détermination de leur nombre et de leurs fonctions fera partie des règlements que l'agence préparera, pour être ensuite soumise à la Convention Nationale par son comité d'instruction publique.

" Art. 18.—Le choix des mesures appropriées à chaque espèce de marchandise, aura lieu de manière que, dans les cas ordinaires, on n'ait pas besoin de fractions plus petites que les centièmes.

" L'agence recherchera les moyens de remplir cet objet, en s'écartant, le moins possible, des usages du commerce.

" Art. 19.—Au lieu des tables de rapports entre les anciennes et les nouvelles mesures, qui avaient été ordonnées par le décret du 8 mai 1790, il sera fait des échelles graphiques pour estimer ces rapports, sans avoir besoin d'aucun calcul.

" L'agence est chargée de leur donner la forme la plus avantageuse, d'en indiquer la méthode et de la répandre autant qu'il sera nécessaire.

" Art. 20.—Pour faciliter les relations commerciales entre la France et les nations étrangères, il sera composé, sous la direction de l'agence, un ouvrage qui offrira les rapports des mesures françaises avec celles des principales villes de commerce des autres peuples.

" Art. 21.—Pour subvenir à toutes les dépenses relatives à l'établissement des nouvelles mesures, ainsi qu'aux avances indispensables pour le succès de cette opération, il y sera affecté provisoirement un fonds de cinq cent mille livres que la trésorerie nationale tiendra, à cet effet, à la disposition de la commission d'instruction publique.

" Art. 22.—La disposition de la loi du 24 Novembre 1793, qui rend obligatoire l'usage de la division décimale du jour et de ses parties, est suspendue indéfiniment.

" Art. 23.—Les articles des lois antérieures au présent décret, et qui y sont contraires sont abrogés.

" Art. 24.—Aussitôt après la publication du présent décret, toute fabrication des anciennes mesures est interdite en France, ainsi que toute importation des mêmes objets venant de l'étranger, à peine de confiscation et d'une amende du double de la valeur des dits objets.

" La commission des administrations civiles police et tribunaux, et celle des revenus nationaux sont chargées de l'exécution du présent article.

" Art. 25.—Dès que l'étalon prototype des mesures de la France aura été déposé au Corps Législatif par les commissaires chargés de sa confection, il sera élevé un monument pour le conserver et le garantir de l'injure des temps.

" L'agence temporaire s'occupera d'avance du projet de ce monument, destiné à consacrer, de la manière la plus indestructible, la création de la République, les triomphes du peuple français et l'état d'avancement où les lumières sont parvenues dans son sein.

" Art. 26.—Le comité d'instruction publique est chargé de prendre tous les moyens de détail nécessaires pour l'exécution du présent décret et l'entier renouvellement des poids et mesures dans toute la France.

" Il proposera successivement à la Convention les dispositions législatives qui devront en dépendre.

" Art. 27.—L'agence temporaire rendra compte de ses opérations à la commission d'instruction publique et au comité de ce nom, avec lequel elle pourra correspondre directement pour la célérité des opérations.

" Art. 28.—Il est enjoint à toutes les autorités constituées ainsi qu'aux fonctionnaires publics, de concourir, de tout leur pouvoir, à l'opération importante du renouvellement des poids et mesures."

Some further laws and decrees followed for the more effectual carrying out of the new system, amongst which were the following:—Law of 1 Vendémiaire, An IV. (22 Sept. 1795), for the progressive substitution of the weights and measures of the new system in exchange for those of the old system, in the course of two years, and at the expense of the State. All persons in business, on exhibiting their patents, were to receive new Metric weights and measures in exchange for old. This proceeding was to be begun in Paris, and to be afterwards extended to the Department de la Seine, and then to the other Departments, according as the construction of the new weights and measures would allow.

Decree of the Directory, 27 Brumaire, An VII. (17 November 1798), for re-establishing offices of public weights and measures, in order to accelerate the use of those of the new system.

Decree of the Directory, 19 Germinal, An VII. (8th April 1799), relating to the verification and stamping of the new weights and measures, and their exclusive use throughout France.

Proclamation, 11 Thermidor, An VII. (29th July 1799), for regulating the standard metal of the new measures of capacity.

In the meantime, the construction of the new standards, the platinum metre and kilogram, was being completed, and they were deposited by the members of the Institute with the legislative body on 22nd June 1799. They were legally constituted as the primary standards of length and weight throughout France, by which all weights and measures were to be regulated, under the following law:—

Loi du 19 *Frimaire, An* VIII. (9 *December* 1799).

"La commission du Conseil des Anciens, créée par la loi du 19 brumaire, adoptant les motifs de la déclaration d'urgence qui précède la déclaration ci-après, approuve l'acte d'urgence.

"La commission du Conseil des Cinq-cents créée par la loi du 19 brumaire, an VIII., délibérant sur la proposition formelle de la commission consulaire exécutive, contenue dans son message du 4 de ce mois, d'adopter définitivement le mètre et le kilogramme déposés au Corps Législatif par l'Institut national des Sciences et des Arts, et de frapper une médaille qui transmette à la postérité l'opération qui lui sert de base.

"Considérant qu'on ne peut trop s'empresser de fixer la valeur du mètre et celle du kilogramme avec toute la précision que lui assurent les travaux des savants qui l'ont déterminée, et de consacrer l'époque glorieuse, pour la nation française, à laquelle a été consommée une opération aussi vaste et d'un aussi grand intérêt, declare qu'il y a urgence.

"La Commission, après avoir déclaré l'urgence prend la resolution suivante:

"Art. 1er.—La fixation provisoire du mètre à trois pieds onze lignes quatre cent quarante millièmes, ordonnée par les lois du 1er août 1793 et 18 germinal, an III., demeure révoquée et comme non avenue. La dite longueur, formant la dix-millionnième partie de l'arc du meridien terrestre compris entre le pôle nord et l'équateur, est définitivement fixée, dans son rapport avec les anciennes mesures, à trois pieds onze lignes deux cent quatre-vingt-seize millièmes.

"Art. 2.—Le mètre et le kilogramme en platine, déposés le 4 messidor dernier au Corps Législatif par l'Institut national des Sciences et des Arts, sont des étalons définitifs des mesures de longueur et de poids dans toute la France. Il en sera remis à la commission consulaire des copies exactes pour servir à diriger la confection des nouvelles mesures et des nouveaux poids.

"Art. 3.—Les autres dispositions de la loi du 18 germinal, an III., concernant tout ce qui est relatif au système métrique ainsi qu'à la nomenclature et à la confection des nouveaux poids et des nouvelles mesures, continueront à être observées.

"Art. 4.—Il sera frappé une médaille pour transmettre à la postérité l'époque à laquelle le système métrique a été porté à sa perfection, et l'opération qui lui sert de base. L'inscription du côté principal de la médaille sera: A Tous les Temps, A Tous les Peuples; et dans l'exergue: République Française, An VIII. Les consuls sont chargés d'en régler les autres accessoires.

"Art. 5.—La présente résolution sera imprimée."

Nomenclature of Metric weights and measures in 1791 and 1795.

When it had been determined by the original Commission of Weights and Measures, appointed by the French Academy, that the ten-millionth part of the distance from the equator to the pole should be the unit of length, and called a mètre, they also decided * upon the following names to be given to its decimal parts and multiples, as simple, monosyllabic, and independent of each other:—

1,000th part of a mètre	*trait*	(line).
100th „	*doigt*	(digit).
10th „	*palme*	(palm).
10 mètres	*perche*	(perch).
100 „	*stade*	(furlong).
1,000 „	*mille*	(mile).
10,000 „	*poste*	(post).
100,000 „	*degré*	(degree).
1,000,000 „ or the 10th part of the quadrant of the meridian	*décade*	(decade).

They proposed also the names of the weights to be—

10th part of a gramme	*Grain*	(grain).
1 gramme	*Maille*	(name of an old French coin worth something less than a farthing).
10 grammes	*Drâme*	(dram).
100 „	*Once*	(ounce).
1,000 „	*Livre*	(pound).
10,000 „	*Décal.*	
100,000 „	*Quintal.*	
1,000,000 „	*Millier.*	

And the names of measures of capacity—

Litre	*Pinte*	(pint).
10 litres	*Boisseau*	(bushel).
100 „	*Setier*	(old French measure).
1,000 „	*Tonneau*	(ton).

After the suppression of the French Academy, in the midst of the revolutionary tumult in 1793, and the appointment by the government of a Temporary Commission of Weights and Measures, which was superseded by another Scientific Commission in 1795, the present denominations of the Metric weights and measures, in the decimal scale of which the parts are named from the Latin and the multiples from the Greek, were finally adopted by the National Convention, under the law of 18 Germinal, An III. (7th April 1795), and are also annexed to the law of 4th July 1837.

Permissive use of the old denominations by decrees of 1801 and 1812.

By a decree of the Consulate of 13 Brumaire, An IX. (3rd Nov. 1800), the ancient names of weights and measures, corresponding to those determined upon by the original Commission of 1791, were authorized to be applied to the new Metric weights and measures, without reference to the former values of these ancient names. This decree was repealed by a subsequent Imperial decree of 12th February 1812, which, however, still permitted the use of the old weights and measures, in fixed relation to the new Metric system, and generally authorized the continuance of such weights and measures as were then generally used in trade transactions, and suited to the wants of the public, provided they bore upon them their relation to Metric weights and measures.

* Base du Syst. Métr. vol. i. p. 59.

Table of names at the several periods.

The following Table, taken from the "Base du Système Métrique," vol. 1, p. 59, shows the names assigned at these several periods to Metric weights and measures.

Académie des Sciences.		Commission Temporaire.	Loi du 18 Germinal.	Arrêté du 13 Brumaire an IX.	Valeurs.
Décade					1,000,000 mètres.
Degré		Grade ou degré			100,000 „
Poste			Myriamètre	Lieue	10,000 „
Mille	Millaire	Millaire	Kilomètre	Mille	1,000 „
Stade			Hectomètre		100 „
Perche			Décamètre	Perche	10 „
Mètre	Mètre	Mètre	Mètre	Mètre	1 „
Palme	Décimètre	Décimètre	Décimètre	Palme	·1 „
Doigt	Centimètre	Centimètre	Centimètre	Doigt	·01 „
Trait	Millimètre	Millimètre	Millimètre	Trait	·001 „
Tonneau	Muid	Cade	Kilolitre	Muid	Mètre cube.
Setier	Décimuid	Décicade	Hectolitre	Setier.	
Boisseau	Centimuid	Centicade	Décalitre	Boisseau, Velte.	
Pinte	Pinte	Cadil	Litre	Pinte	Décimètre cube.
			Décilitre	Verre.	
			Centilitre.		
Millier	Millier	Bar		Millier.	
Quintal		Décibar		Quintal.	
Décal		Centibar	Myriagramme.		
Livre	Grave	Grave	Kilogramme	Livre	Décimètre cube d'eau distillée.
Once	Décigrave	Décigrave	Hectogramme	Once.	
Dráme	Centigrave	Centigrave	Décagramme	Gros.	
Maille	Milligrave	Gravet	Gramme	Deniers.	
Grain		Décigravet	Décigramme	Grain.	
		Centigravet	Centigramme.		
		Milligravet	Milligramme.		
		Are	Hectare	Arpent	10,000 métr. carrés.
		Dèciare			1,000 „
		Centiare	Are	Perche carrée	100 „
					10 „
			Centaire	Mètre carrée	1 „
			Stère	Stère	Mètre cube.
			Dèci stère	Solive.	
Unité monétaire					Décagr. d'argent.
			Franc	Franc	5 grammes d'argent.
			Décime	Sol.	
			Centime	Denier.	

Imperial decree of 12 February 1812.

It was stated before the weights and measures committee of 1862 (Levi, Q. 68), that this Imperial decree of 12th February 1812 virtually superseded the law which had established the Metric system, and practically prevented its adoption in France. Its text is as follows :—

12 *Février* 1812.—*Décret.*

"Désirant faciliter et accélérer l'établissement de l'uniformité des poids et mesures dans notre empire :

"Art. 1er.—Il ne sera fait aucun changement aux unités des poids et mesures, telles qu'elles ont été fixées par la loi du 19 frimaire, an VIII.

"Art. 2.—Notre ministre de l'intérieur fera confectionner, pour l'usage du commerce, des instruments de pésage et de mesurage qui présentent, soit des fractions, soit les multiples des dites unités, les plus en usage dans le commerce, et accommodés aux besoins du peuple.

"Art. 3.—Ces instruments porteront, sur leurs diverses faces, la comparaison des divisions et des denominations établies par les lois, avec celles anciennement en usage.

"Art. 4.—Nous nous réservons de nous faire rendre compte, après un délai de dix années, des résultats qu'aura fournis l'experience, sur les perfectionnements que le système des poids et mesures serait susceptible de recevoir.

"Art. 5.—En attendant, le système légal continuera à être seul enseigné dans toutes les écoles, y compris les écoles primaires, et à être seul employé dans toutes les administrations publiques, comme aussi dans les marchés, halles, et dans toutes les transactions commerciales et autres, entre nos subjets."

The Decree was followed by a ministerial circular of 28th March 1812, containing a list of the old weights and measures thus allowed to be used, and

Followed by ministerial circular of 28th March and 19th April 1812.

their legal equivalents in the new Metric weights and measures, viz. :—

The toise	= 2 mètres.
$\frac{1}{6}$ toise, or the foot, divided into 12 inches	= 333$\frac{1}{3}$ millimètres.
The ell (*aune*) divided into half, quarters, sixths, eighths, twelfths, and sixteenths	= 12 décimètres.
The double bushel (*boisseau*), bushel, half bushel, and quarter bushel	= $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, hectolitre.
Liquid measures of capacity	= $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$ litre.
The pound (*livre*)	= 500 grammes.
Half pound (*demi-livre*)	= 250 „
Quarter pound (*quarteron*)	= 125 „
One-eighth pound (*demi-quart*)	= 62·5 „
The ounce (*once*)	= 31·3 „
Half ounce (*demi-once*)	= 15·6 „
Quarter ounce (2 *gros*)	= 7·8 „
One-eighth ounce (*gros*)	= 3·9 „

Numerous objections having been taken to this course, as setting aside the decimal scale, the following explanatory ministerial circular was issued :—

" *Circulaire du* 10 *Juillet* 1812.

" Le plus grand obstacle qu'ait rencontré l'établissement du système métrique, n'est ni dans les dénominations, ni dans le mode de division, mais dans la nécessité d'apprécier sans cesse les rapports des mesures nouvelles avec les anciennes.

" L'application des anciennes dénominations pourra avoir quelques avantages ; mais ces dénominations rappelleront aux peuples des diverses contrés de l'empire, des choses bien différentes, et il est à craindre qu'il n'en résulte qu'embarras et confusion.

" Le peu d'avantages qu'a procurés l'arrêté du 13 brumaire, an IX., annonce assez qu'on n'en doit pas attendre de plus marquées de nouvel ordre de choses.

" Si l'on peut se faire une idée assez exacte des rapports des unités des mesures usuelles avec celles des mesures anciennes, il n'en sera pas de même des fractions. Ainsi, par exemple, on pourra fort bien comprendre que la toise aura, en mesures anciennes de Paris, 6 pieds 1 pouce 10 lignes et 592, 1000^{mes} ; mais lorsqu'on descendra aux fractions, commes elle ne seront plus dans un rapport exact ni avec les mesures locales ni avec les mesures decimales, le problème deviendra insoluble pour le plus grande nombre.

" Quelque légères que soient les différences que les nouvelles mesures auront avec les anciennes, ces différences cependant ne pourront être negligées dans le calcul exact, dans les transactions du commerce, dans les ouvrages de l'art ; et de là, la nécessité de faire sans cesse des calculs de comparaison qui entravent les opérations du commerce et autres. Le rapprochement entre les mesures usuelles et les anciennes de Paris ne procurera aucun avantage aux peuples des contrées où ces mesures anciennes sont inconnues.

" Les changements dont ils s'agit altereront l'institution première dans ses attributes les plus essentiels, la division décimale et l'uniformité ; la division décimale en ce qu'elle sera remplacée par une autre, et l'uniformité en ce que la méthode créée pour les détails ne sera plus d'accord avec celle établie pour les opérations d'un ordre supérieur.

" La simplicité du système ne sera plus la même, parceque le commerce, les arts, l'administration publique, auront constamment des conversions à faire pour ramener les quantités des mesures usuelles aux mesures légales ; opérations qui deviendront d'autant plus compliquées, qu'elles embrasseront tout-à-la-fois les mesures locales, systématiques et vulgaires."

From 1812 to 1837, the concurrent use of the two systems of weights and measures, the *système usuel* and the Metric system, was thus sanctioned by law ; until the government of Louis Philippe passed the law of 4th July 1837, establishing the Metric system exclusively throughout France from 1st January 1840.

The text of this law, which, together with the laws of the years 1795 and 1799, forms the French code of weights and measures, is as follows :—

Loi du 4 *Juillet* 1837.

" Louis Philippe, roi des Français, à tous présents et à venir, salut :

" Nous avons proposé, les Chambres ont adopté. Nous avons ordonné et ordonnons ce qui suit :

" Art. 1$^{er.}$—Le décret du 12 février 1812, concernant les poids et mesures, est et demeure abrogé.

" Art. 2.—Neanmoins, l'usage des instruments de pesage et de mesurage, confectionnés en exécution des articles 2 et 3 du décret précite, sera permis jusqu'au 1$^{er.}$ janvier 1840.

" Art. 3.—A partir du 1er janvier 1840, tous poids et mesures autres que les poids et mesures établis par les lois des 18 germinal, an III., et 19 frimaire, an VIII., constitutives du système métrique décimal, seront interdits, sous les peines portées par l'art. 479 du code pénal.

" Art. 4.—Ceux qui auront des poids et mesures autres que les poids et mesures ci-dessus reconnus, dans leurs magasins, boutiques, ateliers ou maisons de commerce, ou dans les halles, foires ou marchés, seront punis comme ceux qui les emploieront, conformément à l'art. 479 du code pénal.

" Art. 5.—A compter de la même époque toutes dénominations de poids et mesures autres que celles portées dans le tableau annexé à la présente loi et etablis par la loi 18 germinal, an III., sont interdites dans les actes publics, ainsi que dans les affiches et les annonces.

" Elles seront également interdites dans les actes sous seing privé, les registres de commerce et autres écritures privées produits en justice.

" Les officiers publics contrevenants seront passibles d'une amende de vingt francs, qui sera recouvrée sur contrainte, comme en matière d'enregistrement.

" L'amende sera de dix francs pour les autres contrevenants ; elle sera perçue pour chaque acte ou écriture sous signature privée ; quant aux registres de commerce, ils ne donneront lieu qu'a une seule amende pour chaque contestation dans laquelle ils seront produits.

" Art. 6.—Il est défendu aux juges et arbitres de rendre aucun jugement ou décision en faveur des particuliers sur des actes, registres ou écrits, dans lesquels les dénominations interdites par l'article précédent auraient été insérées, avant que les amendes encournes aux termes du dit article aient été payées.

" Art. 7.—Les vérificateurs des poids et mesures constateront les contraventions prévues par les lois et réglements concernant le système métrique des poids et mesures.

" Ils pourront procéder à la saisie des instruments de pesage et de mesurage dont l'usage est interdit par les dites lois et réglements.

" Leurs procès-verbaux feront foi en justice, jusqu'à preuve contraire.

" Les vérificateurs prêteront serment devant le tribunal d'arrondissement.

" Art. 8.—Une ordonnance royale réglera la manière dont s'effectuera la vérification des poids et measures."

A copy of the Table of Metric Weights and Measures, which is annexed to this law, will be found at page 40, under the head of " Verification of French Metric Weights and Measures." It will be seen that the table includes the following weights of silver coins.

Franc	5 grammes of silver of the standard of $\frac{9}{10}$ fine silver.
Décime	$\frac{1}{10}$ of the franc.
Centime	$\frac{1}{100}$ „

Relation of the French coinage to the Metric system.

The relation of the French monetary system of coinage to their system of weights and measures, not only in regard to the dimensions and weight of their coins, but also to the uniform scale of multiples and parts of the units, which is adopted in both systems,

(that is to say, the decimal scale, with the addition of the double and half of each weight, measure, and coin in this decimal scale,) constitutes a part of the Metric system established in France, and is considered essential for its completion.

The series of French coins, the metal of which they were to be composed, the weight, dimensions, and errors tolerated, are shown in the following table, officially certified 5th May 1852:

Name and Value of Coins.		Composition. Exact.		Composition. Error tolerated.	Weight. Exact.	Weight. Error tolerated.	Diameter.	Number of pieces per kilogram.
							Mm.	
Gold	20 francs	Gold	0·0	0·002	6·45161	±0·002	21	155
Gold	10 francs	Copper	0·1	0·002	3·22580	±0·002	19	310
Silver	5 francs				25·	±0·003	37	40
Silver	2 francs	Silver	0·9	0·003	10·	±0·005	27	100
Silver	1 franc	Copper	0·1	0·003	5·	±0·005	23	200
Silver	5 decimes			0·003	2·5	±0·007	18	400
Silver	2 decimes			0·003	1·	±0·010	15	1,000
Bronze	1 decime			—	10·	±0·01	30	100
Bronze	5 centimes	Pure Copper	95	—	5·	+0·01	25	200
Bronze	2 centimes	Tin	4	—	2·	+0·015	20	500
Bronze	1 centime	Zinc	1	—	1·	+0·015	15	1,000

Observations.—According to the diameter of the piece the length of the metre is found by putting edge to edge. 19 pieces of 5 fr. + 11 pieces of 2 fr.; 20 pieces of 2 fr. + 20 pieces of 1 fr.; 20 pieces of 5 c. + 20 pieces of 1 fr.; 29 pieces of 5 c. + 7 pieces of 10 fr., &c.

By the Monetary Convention of 23d December 1865, between France, Belgium, Italy, and Switzerland (a copy of which is appended to the Report of the Commission on International Coinage, 1868, p. 158), the Weight, Standard, and Diameter of the Gold and Silver Coinage to be coined from 1st August 1866, by the several contracting parties, was fixed as follows:—

—	Value of Coins.	Weight. Exact Weight.	Weight. Error tolerated in Excess or Deficiency.	Standard. Exact Standard.	Standard. Error tolerated in Excess or Deficiency.	Diameter.
	Francs.	Grams.	Thousand parts.	Thousand parts.	Thousand parts.	Millimètres.
	100	32·25806	1			35
	50	16·12903	1			28
Gold	20	6·45161	2	900	2	21
Gold	10	3·22580	2			19
Gold	5	1·61290	3			7
	5	25·	3	900	2	37
	2	10·	5			27
Silver	1	5·	5	835	3	23
Silver	0·5	2·5	7			18
Silver	0·2	1·	10			16

Extent to which the Metric system is now adopted in France.

There does not appear to be very satisfactory information as to the extent to which the Metric system of weights and measures has been adopted in France up to the present time, although some evidence was given upon this point before the Committee of Weights and Measures in 1862, and principally by M. Chevalier. (Qq. 578–660.) This evidence tends to show that the Metric system is generally adopted in France, the exception being in the rural districts and by the peasantry; the *livre*, or pound, is more adhered to than the *pied* or foot.

The primary French Metric Standards and the principal Official Copies; mode and periods of Verification.

Primary French Metric standards and their official copies.

The primary French Metric standards are the platinum metre, and kilogram deposited at the Palais des Archives in Paris in 1799; and known as the Mètre des Archives and the Kilogramme des Archives. The secondary standards originally constructed for regulating weights and measures throughout France were the brass metre and kilogram deposited at the Observatoire under the charge of the Bureau des Longitudes, an office forming part of the department of the Ministre de l'Instruction Publique. These secondary standards were constructed at the same time as the primary platinum standards. A platinum copy of each of the primary Metric standards was also at the same time constructed to save these original standards, and for the purpose of verifying the Metric standards of foreign countries where the Metric system was adopted. These copies, which were considered as next in authority to the primary standards, were called the *Mètre de l'Observatoire*, and the *Kilogramme de l'Observatoire*. At a later period, when the regulation of weights and measures in France was entrusted to the Conservatoire des Arts et Métiers, under the authority of the Minister of Commerce, the collection of official standards of weights and measures was transferred to the Conservatoire by a ministerial decree, dated 28th April 1848.* The principal platinum standards of this department, which were called respectively the *mètre du Conservatoire* and the *kilogramme du Conservatoire*, were constituted the primary official Metric standards for comparison. The standards of the Observatoire appear to have been thenceforward rarely used, and for scientific purposes only.

Metre des Archives. Primary standard and unit length.

With respect to the state of preservation of the primary standard metre, it is stated by M. Saigey† that wherever this standard is used for comparisons, it is placed upon the brass rule of the comparateur opposite two measuring studs, one fixed and the other moveable by means of a micrometer screw. The end of the standard metre is thus pressed upon by one of these studs and against the other, in order that a similar process may be taken with the metre to be compared with the standard. This process must inevitably tend to diminish the scientific accuracy of this primary standard.

A more serious injury is stated by M. Saigey to have been inflicted on the principal secondary standard of length, the platinum *mètre de l'Observatoire*. Upon one occasion when it was under observation by some officers of the French ordnance survey, this standard was caught by the tail of a coat and thrown to the ground and one of its ends damaged.

* Annuaire Almanack.
† Pratique des Poids et Mesures, 1868, p. 115.

Both these standards are mètres-à-bouts, a form of standard of length most liable to injury from use or accident.

Steinheil in his description of the platinum mètre des Archives * states his opinion that it is most unfortunate that the prototype metre should have been constructed as an end standard, especially when made of so soft a metal as platinum ; that platinum might have been proper for a line standard, but is altogether unsuitable for an end standard ; and that not only are its ends liable to alteration from the operations of comparisons, but its whole length from an accidental blow or from bending.

The unit of Metric weight was originally determined to be the weight in a vacuum of a cubic decimetre of distilled water at its maximum density. It was required to construct a metallic standard of equivalent weight, and it was determined† that the preferable form of this standard weight was a cylinder of a height equal to the diameter of its base. As the first step towards attaining this object, a brass (laiton) cylinder with these proportions, and of a determinate and convenient size, was constructed by M. Fortin. This brass cylinder was found by accurate measurements to have a mean height of 0·2437672 metre, and a mean diameter of 0·2428368 metre, at a temperature of 17·6° C. A provisional kilogram was also constructed, the weight of which was estimated, according to the results of experiments made, to be equal to the unit of weight determined upon ; together with other subordinate weights. The result of numerous weighings of the cylinder, both in air and in water, with the view of ascertaining the exact weight of the volume of water displaced by it, was to determine* that the weight in a vacuum of a cubic decimetre of distilled water at its maximum density, or at a temperature of about 4° Cent., was equal to ·9992072 of the provisional kilogram, or to 2 livres 5 gros 35 grains = 18827·15 grains of the old standard, the Poids de Marc. This weight was therefore definitively adopted as the true weight of the kilogram, the unit of metric weight.

See further, App. VI., p. 126.

From the provisional kilogram thus corrected, two standard weights were made by M. Fortin, one of platinum, the primary Metric standard kilogramme des Archives, the other a brass standard intended for ordinary standard comparisons, and to be used for all weighings in air.† *These two standards were considered to be both of the true weight when weighed in a vacuum.* The volume of the platinum kilogram was 2·4 French cubic inches, that of the brass kilogram more than 6 cubic inches ; the effect of this difference in volume was stated to be that when weighed in air the apparent weight of the brass kilogram was about 1⅔ French grains, or 88·4 milligrams (= 1·36419 British grain) less than the platinum standard. The brass kilogram appears to have been originally deposited at the Bureau des Longitudes, but to have been subsequently placed in the Ministère de l'Intérieur.‡

Primary platinum standard kilogramme des Archives, and official brass copy.

The precise density of the platinum primary standard kilogram was not ascertained by the Commission of Weights and Measures. It is stated by M. Saigey § that its approximate volume being 2·4 cubic inches = 47·6 cubic centimetres, the density of the platinum of which it was composed would be about 21 ; but that a more exact measurement of this standard made by himself gave,—

Dimensions and volume of the kilogramme des Archives.

Its diameter 39·4 millimètres (=1 ·5512 inch.)
„ height 39·7 „ (=1 ·5630 inch), whence he computed its volume=48·33 centimètres.
its density=20·7 „
and weight of ordinary air displaced=62·8 milligrams (or ·96913 grains), assuming the weight of air compared with the weight of water to be as 1 to 770.

Steinheil also gives a description of this primary kilogram in his paper on the Bergkrystall-Kilogram (p. 185). He states that the result of his examination in 1837 through a magnifiing glass was, that the surface of this platinum cylinder is upon the whole well worked, but has upon it a number of fine flaws and spots (*Risse und Punkte*). Specks (*Flecken*) are also apparent in several places, which may either be owing to the impurity of the platinum, or to grains of emery pressed into the soft metal when polished. His measurement of it agrees with that stated by M. Saigey ; and he laments the uncertainty of its weight from his density not having been ascertained, as it has never been weighed in water. Steinheil gives as the mean result of his measurement of the kilogramme des Archives, and those of Olufsen and Gambey : Mean diameter = 39·4668^{mm}, and mean height = 39·7704^{mm} reduced to a temperature of 0° C.; and from a computation of its specific gravity by comparing it with Schumacher's platinum kilogram, the specific gravity of which was known, he came to the conclusion that its specific gravity = 20·548. He adds (p. 194), that as the specific gravity of pure platinum is known to vary only between 21·16 and 21·21, it is evident that the metal of which the kilogramme des Archives is composed is not pure platinum. If platinum contains iridium, the specific gravity of which is 23·6, its specific gravity is increased. But if it contains palladium, osmium, or rhodium, the specific gravity of which is respectively 11·3, 10, and 11, it would necessarily be specifically lighter. He thinks, therefore, that the platinum of the kilogramme des Archives contains some of these lighter metals, and adds, that the impurity of the platinum is known to the French *savants*, who dare not use water with this standard for fear of oxydation and altering its weight. He is also of opinion (p. 169) that it is impossible to prevent dust from settling on this standard, and causing it to be somewhat heavier in the course of time.

The results of Professor Miller's comparisons in 1844 of the kilogramme des Archives showed its density to be 20·5487 ‖ ; the weight of air displaced by it (t = 18·7 C., t = 755·64^{mm}) = 0·89981 grains¶ of the imperial standard pound ; its weight = 15432·34874 grains,** or 2·20462125 lbs.; and the weight of the imperial standard pound = 453·5926525 grams of which the kilogramme des Archives contained 1,000. This computation of the weight of the standard kilogram does not agree with that formerly stated in the Annuaire du Bureau des Longitudes, where the kilogram was stated as = 15,438·355 grains. But it is adopted in the Metric Act of 1864, the legal equivalent in imperial weight of the kilogram being 15432·3487 grains, and that of the gram 15,433 grains ; it is also now adopted by M. Mathieu in the Annuaire du Bureau des Longitudes, where it is stated at 15432·349 grains.

Comparison by Professor Miller in 1844, and equivalent in imperial weight.

The exact temperature at which water is at its maximum density is not stated in the "Base du Système Métrique," in the account of the construction of the standard kilogram. This temperature is stated to be nearly 4° C.†† It appears from the account of the verification of the French standards for the American Government by M. Silbermann in 1852, that the temperature is taken at 4°. Professor Miller (p. 790) adopts 3·945° C., or 39·101° Fahr., being the result obtained by Messrs. Playfair and Joule.‡‡

Temperature of maximum density of water.

It has been stated that the primary Metric standards, the platinum metre and kilogram, were deposited at the Palais des Archives at Paris on 22d June 1799,

Construction of platinum standards, mètre and kilogramme de l'Observatoire.

* Ueber das Bergkrystall-Kilogram, &c., p. 251.
† Base du Syst. Métr., vol. iii. p. 565.

* Base du Syst. Métr., vol. iii. p. 579.
† Ib., p. 644.
‡ Pratique des Poids et Mesures, 1856, p. 64.
§ Ib., p. 62.
‖ Construction of Standard Pound, p. 881.
¶ Ib., p. 894.
** Ib., p. 893.
†† Base du Syst. Métr., vol. iii. p. 635.
‡‡ Memoirs of the Chemical Society, vol. 3, p. 199.

in pursuance of Article II. of the Law of 18 Germinal, An III. (7th April 1795), and that at the same time platinum copies of the standard metre and kilogram were deposited at the Observatoire,* under the charge of the Bureau des Longitudes, to serve for the verification of such copies as might be required for the more delicate scientific operations, without being obliged to have recourse so frequently to the standards at the Archives. These platinum standards of the Observatoire were accordingly constructed by MM. Lenoir and Fortin, who had made the primary standards, with which it was stated that they exactly corresponded, or at least that the differences were so small that they were inappreciable ; they were also declared to be entitled to the same confidence as the primary standards.

Reverification of the mètre de l'Observatoire in 1806.

In order to afford a further proof of the accuracy of these standards of the Observatoire, a reverification of them was made in 1806 by some of the members of the original Commission of Weights and Measures. The comparison of the mètre des Archives, and the platinum mètre de l'Observatoire was made at the Palais des Archives on 26th June 1806, the Procès-verbal † being signed by MM. Delambre, Prony, Bouvard, Burchhardt, and Belleyme, who were also members of the Bureau des Longitudes, and by others. The two standards of the Observatoire had been carried to the Archives on the previous day, in order that they might acquire the same temperature as the primary standards. The process of comparison occupied from 1.30 a.m. to 3 a.m., the temperature varying only from 22·8° to 23° of the Centigrade thermometer. A great number of comparisons of the two metres was made with M. Lenoir's new comparing apparatus, in the presence of M. Lenoir and of his son, the measures being taken in the line of their axis, that is to say, in the middle of their section. The definitive result was that the mètre de l'Observatoire was found to be longer than the mètre des Archives by less than one six-hundred-thousandth part, or 0·00166 millimètre (0·0000656 inch). This difference being within the probable error of the observations, it was determined that the two standards ought to be considered exactly equal.

Description of Lenoir's comparing apparatus, standards of length.

No details of the comparison of these standard metres are stated in the Procès-verbal; but the actual method of comparison may be learned from a description of M. Lenoir's comparing apparatus, which is given in the "Base du Système Metrique."‡ The metre under observation is placed upon a strong brass rule, 2½ metres in length, supported upon a thick plank of deal. One end of the metre rests against a perpendicular piece of steel fixed upon the extremity of the brass rule, or against a moveable heel piece or stud attached to it. A similar perpendicular piece is made to slide in a straight direction along the rule, and is fixed by a screw at the requisite division of the scale. Connected with it is a stud, which is pressed against the other end of the metre, by a spring acting upon the shorter arm of a lever. The longer arm of this lever moves along an index scale, indicating the smallest amount of difference of length between two nearly equal measures thus compared.

Reverification of the kilogramme de l'Observatoire in 1805.

The comparison of the platinum kilogramme de l'Observatoire with the kilogramme des Archives had been previously made on 6th January 1805, in the presence of MM. Delambre, Lefèvre-Gineau, and Prony, members of the Institute and of the ancient Commission of Weights and Measures, M. Burchhardt, a member of the Institute, and M. Belleyme. All these signed the Procès-verbal. M. Fortin, the constructor of the two kilograms, was also present. The balance used was that of Fortin, and the same with which all the weighings of the primary standard kilogram had been made. The observations were continued from 1 to 3.30 p.m. The result was that the kilogramme de l'Observatoire was found to exceed the kilogramme des Archives by less than a millionth part, or a milligram (0·01543 gr.). It was found impossible to assign a more precise weight to the kilogramme de l'Observatoire.

The general result of the comparisons was found to be that the two standards of the Observatoire were entirely in conformity with the primary standards, and that no change had occurred in them since the original verification seven years previously.

Reverification of kilogramme de l'Observatoire in 1837.

Another comparison of the platinum kilogramme de l'Observatoire with the kilogramme des Archives was made in May 1837 by MM. Arago, Gambey, and Steinheil, the details of which are appended by the latter to his description of the Bergkrystall Kilogram (p. 235). The weight of the kilogramme de l'Observatoire was found to exceed the standard by 4·48 mgr. (= 0·06913 gr.), with a probable error of 0·08 mgr.

Its reverification adjusted in 1844.

During the period of Professor Miller's comparisons of the kilogramme des Archives at Paris in 1844, it appears from a memorandum then made by him, and communicated to the Warden of the Standards, that on 14th September 1844 M. Arago compared the platinum kilogramme de l'Observatoire with the kilogramme des Archives, and found the former from 4· to 4·5 mgr. too heavy. He reduced it by grinding it on a hone until it was about 1 mgr. too heavy. Its reduction to the weight of the primary standard was completed by M. Arago on 18th September, when it was verified by being compared six times with the kilogramme des Archives.

Reverification of official brass metric standards, the mètre and kilogramme, in 1850.

A reverification of the official brass metric standards, the mètre de l'Observatoire, and the kilogramme type laiton du Ministère de l'Intérieur, used for regulating the weights and measures throughout the French empire, was made at Paris in 1850, upon the occasion of verifying the primary metric standards for the Duchy of Modena, the Metric system having, by an edict of the reigning duke, dated 17th October 1849, been substituted throughout his dominions for the old system of weights and measures from the beginning of the year 1852.

An official statement of the reverification of these official standards appears in the printed "Procès-" verbal des opérations de vérification qui ont été faites " sur les instruments et sur les étalons de mesure " métriques et pondéraux destinés au Duché de " Modène," bearing date 11th September 1850, and signed J. B. Biot, V. Regnault, J. Bianchi. The precise days upon which the comparisons were actually made are not stated in the Procès-verbal.

Comparison of official brass metre à-traits with the platinum standard.

The official brass metre was verified by comparison with the platinum mètre de l'Observatoire. The details of the comparison are not given in the Procès-verbal, but may be inferred from the more detailed statement which is given of the comparison of the standard metres for the Duchy of Modena with the two official standards respectively.

The comparisons of the metres were made with M. Perreaux's microscopical comparing apparatus, each division of the micrometer being equal to 0·002 millimetres (=0·00008 inch). Three brass mètres-à-bouts, constructed for the Duchy of Modena, were severally compared with the platinum mètre-à-bouts de l'Observatoire, and the brass mètre-à-traits, both standards belonging to the Bureau des Longitudes. The mean of three comparisons was taken in each instance. In comparing the brass metres with the official platinum metre, allowance was made from the difference of expansibility of the two metals, according to their coefficients of expansion as given in the "Annuaire du Bureau des Longitudes."

The two official French standards had been previously compared with each other under very favourable circumstances, at a time when the temperature of the air around them was very nearly at 0° C. (in fact, between 1° and 2°). The brass mètre-à-traits was found to be 0·003 millimetre (=0·00012 inch) less than the platinum mètre de l'Observatoire, precisely the same amount of difference that this last-mentioned standard is in excess of the primary platinum standard mètre des Archives. It was considered therefore that

* Base du Syst. Metr., vol. iii. p. 694.
† Ib., p. 697.
‡ Ib., p. 447.

the brass mètre-à-traits was at 0° C., identical with the primary standard mètre.

Similar comparisons were made of three brass kilograms constructed for the Duchy of Modena, with the brass standard kilogram of the Bureau des Longitudes. But upon this occasion a direct comparison and reverification of the brass standard with the platinum kilogramme de l'Observatoire was also made, and the full details of the comparison are stated in the Procès-verbal.

It is stated that the period of the year was not favourable for the comparison, because, in order to arrive at a strictly accurate result, it was requisite that the two kilograms should be compared at a temperature very near to 0°, so that no allowance need be made for the relative expansion of the two metals. The difference of expansion, however, was so small that its effect upon the volume of the two kilograms, measured by a corresponding difference in the weight of air displaced, would be inappreciable with the balance used. It was considered, therefore, that the unfavourable period of the year might be disregarded without inconvenience.

The platinum standard kilogram was found to be a cylinder having at 17° C.—

a diameter of 39·49 millimètres (1·5547 in.)
and height 39·60 „ (1·5590 in.)

Its volume in cubic centimètres being—

$$\frac{22}{74} \cdot (3{\cdot}949)^2 \,.\, 3{\cdot}960 = 48{\cdot}522^{cc}$$

The volume of the official brass kilogram was not determined directly from the standard itself, but was assumed to be the same as that of one of the brass kilograms of the Duchy of Modena, as the volumes of these two weights "could not differ sensibly." The volume of this last-mentioned kilogram had been found, from weighing it in water, to be, at the temperature of 17 C., 124·715cc.

The apparent difference of weight in air between the standard brass kilogram and the platinum kilogram was determined by an excellent balance, constructed by Gambey and belonging to the Observatoire. At a temperature of 18·9 C., and barometric pressure of 763·8mm, the brass kilogram was lighter than the platinum standard 0·0895 grammes.

From a computation of the difference of volume (76·193cc), and assuming that the amount of vapour in the air was $\frac{2}{3}$ of the quantity in saturated air, the platinum kilogram ought to have weighed more than the brass kilogram - - 0·0921 grams ;

but it actually weighed	-	0·0895 „
Difference	-	0·0026

If, therefore, the official platinum kilogram were considered to be the true standard weight, the brass kilogram would have been too heavy by 2·6 milligrams (0·04012 gr.).

It was, however, considered that the platinum kilogram had not been originally and directly verified by the French Commission of Weights and Measures, whilst the true weight of the brass kilogram had been proved by their own immediate observation. Preference was, therefore, unhesitatingly given to the official brass kilogram as the authoritative standard, and it was determined that it should be now considered as the normal kilogram.

It would appear as if the adjustment by M. Arago in 1844, of the weight of the platinum kilogramme de l'Observatoire to that of the primary kilogramme des Archives, had escaped the notice of the scientific officers who made the comparisons in 1850. Professor Miller refers (p. 894) to this comparison of the official brass kilogram, the kilogramme type laiton (designated by him as 𝔏) with the platinum kilogramme de l'Observatoire, and assumes the latter, after its adjustment by M. Arago, to have been then exactly equal to the kilogramme des Archives (designated as 𝔄), and therefore that in air ($t = 18{\cdot}9°$, $b = 763{\cdot}8^{mm}$) $\mathfrak{L} = \mathfrak{A} - 89{\cdot}5$ mgr., or 1·38117 grains. Hence in a vacuum $\mathfrak{L} = \mathfrak{A} + 2{\cdot}45$ mgr. or 0·03780 gr. ; and in air ($t = 18{\cdot}7°$, $b = 755{\cdot}64^{mm}$), $\mathfrak{L} = \mathfrak{A} - 1{\cdot}36732$ gr., 𝔏 displacing 2·30493 gr., and 𝔄 0·89981 grains of air, and the excess of weight of air displaced by 𝔏 being 1·40512 grains.

Reverification of the platinum mètre and kilogramme du Conservatoire in 1852.

In 1852 a complete collection of the standard weights and measures of France, and of all such apparatus as is furnished to the local Bureaux de Vérification, was presented to the Government of the United States* by the French Government, in return for the splendid series of standard weights and measures of the United States presented to the French Republic in 1848. The standard metre made of steel, and the standard kilogram of brass gilt included in the collection, were compared with and verified by the platinum standard mètre and kilogramme du Conservatoire, these platinum standards having been previously compared with the primary standards of the Archives.

The two platinum metres had been constructed at the same time, and were verified in 1799, and found to be the same. In 1852, after having been together for 24 hours, they were found, upon comparison at 10° C., to be identical in length ; and it was considered, from the small coefficient of expansion of platinum, that there was no sensible difference between them at their standard temperature of 0°.

The two standard kilograms were weighed in air. The volume of the kilogramme des Archives was taken from the mean of a large number of experiments, at 48·6973 cubic centimètres, and that of the kilogramme du Conservatoire at 52·3220 cubic centimètres. The weighings being reduced to a vacuum, the kilogramme du Conservatoire was found to exceed the standard by 3·38 mgr. (= 0·01526 gr.).

Comparison at Paris in 1859 and 1860 of several kilograms with the kilogramme des Archives.

In 1859 and 1860, comparisons of several of the primary kilograms with each other were made, under the following circumstances :—

The Prussian Government being in possession of a platinum kilogram, which had been compared in 1817 by MM. Arago and Humboldt with the kilogram des Archives, and the Austrian Government possessing another platinum kilogram, which had undergone a similar comparison in 1817 by MM. Silbermann and Froment, in presence of M. Tresca, the Sous-Directeur au Conservatoire Impérial des Arts and Métiers, a comparison was made between the two platinum kilograms of Berlin and Vienna ; the result being that the two standards differed considerably. To settle the question of the accuracy of the Berlin kilogram, the French Government, in 1859, at the request of the Prussian Government, appointed a commission to reverify this standard with the kilogramme des Archives at Paris. The commission was composed of M. Regnault, Membre de l'Institut, President ; General Morin, Membre de l'Institut, Directeur du Conservatoire Impérial ; and M. Brix, Prussian Privy Councillor, and Director of the Weights and Measures Commission at Berlin. Their Report, printed at Berlin in French and in German, under the superintendence of M. Brix, was published in 1861.

Report of Commission, 10 September 1860.

This valuable Report† is dated 10th Sept. 1860, and is in considerable detail. It shows the results of the comparison of the following standards with each other:

1. The primary platinum kilogramme des Archives, designated as A in air, and K_a in a vacuum.
2. The platinum kilogramme de l'Observatoire Impérial, designated as O in air, and K_o in a vacuum.
3. The primary platinum kilogramme du Conservatoire, designated as C′ in air, and $K_{c'}$ in a vacuum.
4. The second platinum kilogramme du Conservatoire, designated as C″ in air, and $K_{c''}$ in a vacuum.
5. The platinum kilogram of Berlin, designated as B′ in air, and $K_{b'}$ in a vacuum.
6. The gilt brass kilogram of Berlin, designated as $B_{l''}$ in air, and $K_{b''}$ in a vacuum.

* Report of Secretary of the Treasury to Congress, dated Washington, 31 Dec. 1856.

† Rapport sur les Comparaisons à Paris, en 1859 et 1860, du plusieurs kilogrammes, &c., Publié par ordre du Gouvernement Prussien, Berlin, 1861.

The labours of the Commission were not confined to the comparison of these standards; they endeavoured also to ascertain and set forth all the several circumstances that could influence the comparison of standard weights, and interfere with the accuracy of the weighings, in the hopes of establishing a more certain and uniform method of proceeding, so as to avoid similar errors to those which had hitherto arisen in making such comparisons.

Mode of comparison adopted.

The method of weighing used was by counterpoising, the platinum kilogramme C″ having been invariably placed as a counterpoise in the left-hand pan of the balance. The kilogram under comparison was placed in the right-hand pan, and an equilibrium was obtained as nearly as possible, first by additional weights, and then by noting the difference of the divisions of the index. In comparing two standards A and B, four observations were taken, the 1st and 4th with A, the 2nd and 3rd with B, and the mean difference taken. To ascertain the value of a division, a ½ milligramme (= 0·00776 grain) was put into one of the pans, this process being repeated from time to time to observe if the sensibility of the balance remained the same. The balance used enabled a difference of 0·1 milligram (=0·001543 grain) to be ascertained.

At every weighing the temperature (t) was noted by a Centigrade thermometer placed inside the balance case, the thermometer itself having been previously verified. The height of the barometer was also observed at the beginning and end of each comparison, and the mean taken; this mean, reduced to 0° of temperature (H_o) was that recorded in the tables of observation.

The coefficients of expansion adopted were:—
Of brass, ·00001886 Of platinum, ·00000860

Volume of the several kilograms.

The volumes of the four principal platinum kilograms were determined by accurate measurement, their forms being similar, that of a cylinder with a circular base. Their volumes reduced to 0°, were thus taken to be:—

(A)	Kilogramme des Archives - - - -	48·6724cc
(O)	Kilogramme de l'Observatoire - - -	48·5599
(C′)	Kilogramme du Conservatoire - - -	52·1280
(B′)	Kilogram of Berlin - - - -	49·9378
(B‴)	Brass gilt kilogram of Berlin (Density 8·02657) -	124·6009

The density of B‴ was ascertained by weighing it in air and in water.

Result of comparisons in 1859.

After each comparison by weighing the standards in air, the necessary reduction to a vacuum was made, and the following results were obtained:

Kilogramme du Conservatoire	=	kilogramme des Archives	+ 1·982 mgr.	(= 0·03058 grain)
„ de l'Observatoire	=	„	„ − 0·280	„ (= 0·00432 „)
Platinum kilogram of Berlin	=	„	„ − 12·	„ (= 0·18516 „)
Brass „ „	=	„	„ + 4·028	„ (= 0·06215 „)

Discordance of Prussian kilogram, and subsequent correction.

As the platinum Prussian kilogram differed to such an extent from the primary French standard, M. Brix obtained the permission of his government to have it corrected, and subsequently it was ascertained that, when corrected, it was equal to the kilogramme des Archives, + 0·048 milligram (= 0·00741 grain).

But it became of importance to ascertain the cause of the difference in 1859 of the Prussian kilogram as compared with the primary standard, after it had been certified in 1817 exactly to coincide.

Discordance arisen from original inaccurate comparison in 1812.

It was found that although the certificate of verification, signed by MM. Arago and A. de Humboldt in 1817 (a copy of which is appended to the Report of the Commission), stated that the comparison had been made with the *kilogramme des Archives*, yet that M. de Humboldt had since admitted that it was actually made with the kilogramme de l'Observatoire. This kilogram having been stated in the original certificate of verification in 1805, to coincide with the kilogramme des Archives within an inappreciable difference. The Commission ascertained, however, from a Procès-verbal in the Archives, dated 6 Feb. 1812, (a copy of which they also append) that the result of another comparison made in that year showed the kilogramme de l'Observatoire to be from six to eight milligrammes heavier than the kilogramme des Archives. The inferences drawn by the Commission from this fact were:—

1. That the balance used in 1812 was so wanting in sensibility that it did not indicate a difference of two milligrams (= 0·03086 grain).

2. That it was probable that the comparison in 1817 was made with the same balance.

3. That if the comparisons of the Berlin kilogram in 1817 were made with the balance wanting in sensibility, and with the kilogramme de l'Observatoire, when it was eight milligrams too heavy, and that consequently *the Prussian kilogramme was corrected to this extent*, the cause of the error was very evident.

Second series of comparisons in 1860.

Before entering upon the second and more extended subject of inquiry, the Commission made another series of comparisons of the several primary kilograms in April and May 1860; and as a preliminary step, they took into consideration the several circumstances that might derange the accuracy of comparisons of standard weights of different densities, more particularly with reference to the allowance to be made for the weight of air displaced by each, when weighed in air.

Preliminary considerations.

As to disturbances from weighing in the air.

Their comparisons of platinum kilograms in 1859 were made, as has been stated, by using a platinum kilogram as a counterpoise. It was formerly the practice to use a brass kilogram, and as it could hardly happen that no variation of the temperature and barometric pressure would occur during the weighings, it became necessary, for obtaining an accurate result, to calculate the *relative* effect of this variation upon the weight of air displaced by each standard differing so materially in density. The effect of this possible cause of error was much diminished by using a platinum counterpoise of similar density.

Again, as balances for the most accurate weighings are placed in glass cases, these are ordinarily placed in the most favourable position for light, without taking account of the differences of temperature on the opposite sides of the case. But these differences may cause currents of air so as sensibly to affect the accuracy of the weighings. An ascending current of air diminishes the weight of the pan upon which it acts; and a descending current may at the same time augment the weight of the other pan. This effect may often be observed with very sensible balances, and it will serve to explain the great difficulty found in obtaining identical results in successive weighings made with the most accurate balance, and even when no appreciable variation can be observed in either the thermometer or barometer.

These avoided by weighing in a vacuum.

As they considered that all such discordance would be avoided by weighing in a vacuum; and that, scientifically, an accurate comparison of standard weights can only be made by ascertaining their weights in a vacuum, the commission come to the conclusion that the most simple, most direct, and most rational course was *to make the weighings in a vacuum.*

Balance constructed for these purposes.

For this purpose, therefore, they had a balance of the greatest accuracy and sensibility constructed so that the weighings might be made at pleasure either in ordinary atmospheric air, in air more or less rarified, or even in different gases. An accurate description and a drawing of this balance appears in their report.

But a difficulty was felt in weighing the primary kilogramme des Archives in a vacuum. It had been originally verified by weighings in air, corrected by a calculation of the weight of air displaced, and the same process had been always adopted for verifying other kilograms with it. The Commission hesitated to depart from this precedent and to incur the risk of a possibly discordant result. It would be necessary also to obtain the special permission of the French Government for this purpose, and to pledge themselves that this primary standard would incur no alteration whatever from the process.

They decided, therefore, not to place the kilogramme des Archives in a vacuum, but to make the second series of comparisons in the ordinary way, reserving their experiments of comparisons of weighings in a vacuum with weighings in air to a subsequent period.

Result of comparison of kilogram in 1860.

The details of the several comparisons made by the Commission, both in 1859 and 1860, are given at length in their report, but it may be sufficient here to state the conclusions arrived at. The result of the second series of observations, the weighings being reduced to a vacuum. so far as relates to the primary platinum kilogramme du Conservatoire, were as follows :—

(1.)	1 mgr.	= 3·44 div. of Bal.	—Platinum kilog. du Conservatoire	=	kilog. des Archives	+ 1·936 mgr	(= 0·02987 grain)
(2.)	„	= 2·77 „	„	=	„ „	+ 1·796 „	(= 0·02771 „)
(3.)	„	= 2· „	„	=	„ „	+ 1·956 „	(= 0·03018 „)
(4.)	„	= 2· „	„	=	„ „	+ 2·579 „	(= 0·03980 „)
	Mean comparison in 1860		„	=	„ „	+ 2·067 „	(= 0·03189 „)

Being nearly identical with the result of the comparison in 1859, when the kilogramme du Conservatoire was found to be 1·982 mgr. in excess of the kilogramme des Archives. The mean of the two comparisons shows the kilogramme du Conservatoire to be + 2·024 mgr.

In consequence of the discordance of the Prussian kilogram, which was subsequently corrected, it was thought advisable that a second platinum copy of the French Metric Standard should be constructed for the Prussian Government. Its volume, calculated from its dimensions, was taken to be 47·6019 cc. The results of the comparison of these two kilograms respectively with the kilogramme des Archives are stated to be as follows :—

(1.)	1 mgr.	= 3·44 div.	—No. 1. Berlin platinum kilog.	=	kilog. des Archives	− 0·192 mgr.	(=0·00296 grain).
(2.)	„	= 2·77 „	„ „	=	„ „	− 0·370 „	(=0·00571 „)
(3.)	„	= 2· „	„ „	=	„ „	− 0·699 „	(=0·01078 „)
(4.)	„	= 2·	„ „	=	„ „	− 0·195 „	(=0·00300 „)
			Mean			− 0·364 „	(=0·00561 „)

(1.)	1 mgr.	= 2·77 div.	—No. 2. Berlin platinum kilog.	=	kilog. des Archives	− 2·084 mgr.	(=0·03216 grain).
(2.)	„	= 2· „	„ „	=	„ „	− 2·047 „	(=0·03159 „)
(3.)	„	= 2· „	„ „	=	„ „	− 1·418 „	(=0·02188 „)
			Mean			− 1·850 „	(=0·02855 „)

In the course of the experiments subsequently made by the Commission for the purpose of investigating the phenomena and disturbances of scientific weighings, when several kilograms were compared with their newly constructed balance in ordinary air, and in air more or less rarefied, their attention was directed more especially to three principal points for consideration :—

1. Whether it is possible to ascertain the *true weight* in a vacuum of a platinum or brass kilogram by determining experimentally its apparent weight in air, and adding to it the weight of air displaced by the kilogram, calculated by the means that science now affords.

2. Whether the metals of which standard kilograms are constructed really condense on their surface appreciable quantities of atmospheric air, so as to form part of the mass of these bodies, and really alter their weight.

3. Whether in order to avoid uncertain corrections, it is not preferable to realise experimentally the whole results to be ascertained by the process of weighing, that is to say, to make all the weighings in a nearly complete vacuum, such as is now obtained by air-pumps.

In order to arrive at a complete solution of these three general questions, the Commission thought it necessary first to clear up by direct experiment some particular points upon which their solution must depend. A considerable number of experiments were consequently made, and the conclusion at which the Commission arrived may be stated as follows :—

1. That kilograms of platinum, ordinary brass, brass gilt, or with a vitrified surface, may be placed and kept for several days in a vacuum without observing any sensible change in weighings made at the end of the time, under determinate circumstances.

2. That platinum kilograms do not condense on their surface, or assimilate different quantities of air when plunged into atmospheric air, the pressure of which varies from 6 millim. to 760 millim. This result has been clearly demonstrated by actual experiment. The very small differences of weight shown by these experiments under different pressures, do not appear to be really attributable to condensations of air on the surface of the platinum, but to other disturbing causes. There was, in fact, a considerable difference in the surfaces of the two platinum kilograms experimented on, one of them, specially constructed for the purpose, having 33 times the surface of the other ; and it was the kilogram that had by far the largest surface that appeared to increase in weight as the pressure of the air diminished. But a condensation of air on the surface ought to produce an inverse effect, as the weight of air condensed ought evidently to diminish at the same time as the pressure of the surrounding air.

As to comparative results of weighings in vacuo, and in air.

3. It was the wish of the Commission to ascertain *by direct experiment*, if weighings in a vacuum gave exactly the same relative weight to several kilograms as that deduced from weighings in atmospheric air, after correction for the weight of air displaced by the kilogram and its counterpoise.

To solve this question with certainty is a matter of great difficulty, especially when, as in the experiments made by the Commission, the differences are very small.

Effects of probable errors.

It should be remarked that the comparison of two weights, by the method of double weighing, always requires at least four separate weighings, each having its own personal error. In determining the relative weight of two standards, the several errors may neutralize each other, partly or wholly, but they may also be all on one side, and thus cause a difference equal to their sum. If the possible error in a single weighing is = 0·3 mgr. the possible error in the comparison of two weights by the method of double weighing is four times 0·3 mgr., or 1·2 mgr., and so on in the same proportion.

But if two weights are compared, first by double weighing in air, and then by double weighing in a vacuum, each of these comparisons will naturally have its own error, the limit of which can be appreciated by what has just been stated. It follows, therefore, that the result of two different comparisons may be affected by a double error, amounting to 2·4 mgr. if each weighing is liable to an error of ·3 mgr.

It appeared necessary to refer to the appreciation of possible errors in the experiments made by the Commission, so that the discordances to be presently referred to should not have more importance attached to them than they really deserve. In order to solve the question now under consideration, it would seem to be above all things requisite to ascertain if, in a great number of weighings made under different but definite pressures, the differences always presented themselves on the same side, in which case they must be due to causes susceptible of being defined. If, on the contrary, they were sometimes on one side and sometimes on the other, they could be attributed only to fortuitous and inevitable circumstances, such as the accumulation of errors in the several weighings.

Experiments made, and their results.

To come to a more satisfactory result, the subject was divided into several distinct heads, which were each determined by actual experiment.

1. Two kilograms of the same metal, similar forms, and displacing nearly equal volumes of air, were placed in the two pans of the balance. They were simply weighed against each other, in air differing greatly in pressure. The first question was, in all these cases, Was the same difference found between their weights after correction of the air displaced?

Compari of platin kilogram with eac other.

The first series of experiments was made with seven platinum kilograms, and the results of five different comparisons made each with two different platinum kilograms were as follow :—

		Greatest difference.
Under pressures of	8·36 and 760·60 mm.	= 0·013 mgr.
„	24·63 „ 759·42 „	= 1·245 „
„	8·98 „ 753·90 „	= 1·63 „
„	10·78 „ 754·02 „	= 2·488 „
„	11·18 „ 753·82 „	= 0·07 „

These results were not considered satisfactory.

Two only of the comparisons gave practically the same result; the other three comparisons showing considerably more discordance than could be attributable to errors of observation. It remained doubtful whether these discordances were owing to an accumulation of partial errors in each weighing, to a temporary derangement of the balance, or to an abnormal condensation of air on some of the platinum kilograms which did not occur on others.

Of brass kilogram with each other.

2. A second series of experiments was made with three gilt brass (*laiton doré*) kilograms, each being compared with a fourth, the following being the result :—

			Greatest difference.
Under pressure of	13·07 mm.,	321·14 mm., and 760·20 mm.	= 0·85 mgr.
„	12·04 „	318·47 „ „ 757·86 „	= 1·396 „
„	13·01 „	324·20 „ „ 756·42 „	= 0·443 „

It was concluded that this result showed with certainty that the same relation was found to exist between brass weights, whether weighed in a vacuum or in ordinary air, and allowing for the weight of air displaced by each.

Of a platinum kilogram with a brass kilogram.

3. Comparisons were next made between a platinum and a brass kilogram, the latter being somewhat heavier, viz. :—

Under pressure of	752·96 mm.	= + 0·730 mgr.
„	48·52 „	= + 2·008 „
„	10·80 „	= + 2·342 „
„	410·98 „	= + 0·706 „
„	751·91 „	= + 0·241 „

These differences were attributed to no other cause than errors of observation, the greatest difference being 1·77 mgr.

A second brass kilogram was compared with the same platinum kilogram, and was also found to be somewhat heavier, viz. :—

At a pressure of	751·56 mm.	+ 4·916 mgr.
„	21·16 „	+ 3·932 „
„	11·42 „	+ 4·364 „

The greatest difference being 0·984 mgr., and attributable to errors of observation.

Of both successively with a glass kilogram.

Some further comparisons were made between a glass kilogram, adjusted with mercury, and a platinum kilogram, and also a brass kilogram, with similar results, the greatest difference being 1·732 mgr.

Discordances entirely caused by unequal dilatation the beam the balan

All these experiments were made by simply weighing one kilogram against another, in order to limit as far as possible the accumulation of partial errors. Some of the differences, however, between the results of weighing in a vacuum and in air, far exceeded any possible errors of observation, and the question was then raised as to how they arose. To determine this question a number of new experiments were made by the Commission, and they came to the conclusion that the differences in question were almost entirely caused by the *rapid changes of temperature, consequent on weighing successively in air and in vacuo, producing inequalities in the arms of the balance and thus sensibly affecting the apparent weight*, and that no appreciable effect upon the relative weight of kilograms, however extended their surface may be, and whether of platinum, brass, brass-gilt, or vitreous, is produced by any condensation of *dry* air or of gas upon their surface.

Apparent discordanc in the weighings standards thus ex plained.

In fact, as the result of all their experience in weighings, they found that sensible alterations of the relative length of the two arms of the balance were produced by unequal dilatations from changes in the temperature, corresponding differences being from time to time caused in the apparent weight of standards under comparison.

Conclusion tru weight in vacuum, found by weighing air, and c recting fo air dis placed.

In conclusion, the Commission expressed their conviction of the accuracy of their results of weighing in air and correcting for the air displaced, and that the result showed the true weight in a vacuum. They accordingly certified the true weight of the Prussian kilogram in a vacuum to be as follows :—

By the comparisons of	1859,	the platinum kilogram (No. 1)	0·048 mgr. too heavy.
„	1860,	„	0·364 „ too light.
True weight, being the mean		-	0·158 „ too light.

And that the true weight of the platinum kilogram (No. 2) was 1·85 mgr. too light.

Professor Karsten's remarks upon this report.

Professor Karsten of Kiel has published some remarks upon the Report of the Commission, and with reference to the weight of the Prussian kilograms so determined by comparison with the kilogramme des Archives, which he considers to be much the more important, it being contemplated, under the Prussian law of 17th May 1866, to constitute a new primary pound for Prussia, of the weight of the half kilogram.

He here refers to the linear measurements and other observations made by Schumacher and Olufsen in 1832 and 1834, which made the volume of the kilogramme des Archives = 48,615·4 cubic millimetres.

From some further observations by Schumacher and Gambey in 1837, the corrected volume deduced was 48,650 cmm. These observations were so numerous and made with such extreme care that the result obtained was adopted in 1845, by Professor Miller, in preference to that obtained from his own observations of the volume of the French primary kilogram made with the stereometer, viz., 48,655 cubic millimetres. (See Miller, p. 875–881.) Professor Miller also justly remarks upon the unaccountable oversight of not weighing the standard kilogram in water, and thus determining its density, previous to its final adjustment.

Professor Karsten animadverts upon the discrepancy of the volume of the French standard kilogram, stated to be cubic centimetres 48·6721 at 0°, as compared with several previous scientific measurements which made its volume 48·615, and the corresponding difference in the computation of its weight in a vacuum; and he regrets that the Commission did not carry out their own views by direct comparisons in a vacuum, to confirm their results of weighings in air.

He also draws attention to a more important point —the true relation which the primary kilogram should bear to the primary metre, that is to say, that it should be of the exact weight of a cubic decimetre of water, under certain conditions, the measure in the capacity of which constitutes the litre; and he asks—

Is the kilogram of the Metric system a weight equal to the platinum kilogramme des Archives, as it now exists at 0°, and in a vacuum?

Or,

Is the kilogram of the Metric system a weight which at 0° and in a vacuum is equal to a cubic decimetre or litre of distilled water at its maximum density?

And he adds that no one can doubt that the kilogramme des Archives corresponds as little with its theoretical weight as the mètre with its theoretical length.

Herr Brix replies to these questions in a note, that no one in France at the present time thinks any more about a natural standard; but if any remark is made about the definition of the mètre, kilogramme, &c., the only answer is to refer to the platinum standards deposited in the Archives, and the numerous copies to be found all over the world. That any alteration of these standards is considered by the standards authorities in Paris as wholly out of the question, he shows from the following reply made by M. Regnault to a written communication from himself upon the subject:—

"Quant à la stabilité de notre système métrique j'y repondrai très nettement. Le gouvernment français *n'a jamais songé*, je dit plus, *ne peut pas songer un instant*, à modifier en quoique ce soit le système mètrique aujourd'hui adopté. Les raisons scientifiques que l'on pourrait émettre sur un changement de ce genre seraient absolument puériles, et tomberaient devant la risée générale des gens de bons sens. Dira t'on que le mètre n'est pas exactement la $\frac{1}{10,000,000}$ partie du quart du méridien qui passe par Paris—il n'y a pas deux méridiens qui soient identiques, et je défie l'observateur le plus habile de mesurer deux fois le même arc du méridien et de trouver la même chose, &c. Le mètre type, celui qu'on ne peut ni contester ni changer, est *le mètre étalon en platine déposé aux Archives Impériales*. J'en dirai autant du kilogramme. Le veritable kilogramme est *le kilogramme platine talon déposé aux Archives*. On n'admet pas d'autres chez nous."

With reference to the unit of Metric weight having been determined in France to be the weight of a cubic decimetre of water at its maximum density, Bessel in his Populäre Vorlesungen (edited by Schumacher after Bessel's death, Altona, 1847, p. 300), observes as follows:—

"Other countries have since, in their weights and measures' laws, made the unit of weight dependent upon a given quantity of water. But none of these laws provide that weight is in any case to depend upon a measure of water. For instance, that a vessel must be placed on the pan of a balance, and so much water poured in as may be sufficient to counterpoise the body placed in the other pan for the purpose of being weighed; and then the volume of water measured in order to compute the weight of the body. They provide rather, and lay down the regulation that a material representation of weight is to be used for the process of weighing. The introduction of a material representation of weight is indeed beyond comparison much more fit for this purpose than its reference to a definition, with which besides it may as little correspond as the metre with the ten millionth part of the earth's meridian quadrant. If, for example, by repeated and very accurate weighings of a given measure of capacity of water at its maximum density, another weight were brought out differing from the material weight established by law, any doubt that might arise as to which weight should be adopted would be decided in favour of the latter. In the event of such a case as this actually occurring,* if the regulation of employing the measure of capacity of water were compulsory, it would follow that the two definitions would be more or less irreconcileable with each other. It may be added that to weigh a given quantity in measure of water at its maximum density, and to ascertain its weight with certainty to the ten thousandth part of the whole, is a problem by no means easy to solve, if it has ever yet been solved. Besides, the introduction of water as a means of obtaining a standard weight has a precisely similar effect to the introduction of a measure of length found in nature for establishing a standard of length. The restoration of the standard of weight, in the event of its being lost, is indeed both easier and more certain. The standard weight may be reconstructed by means of the measure of capacity of water, or it may be adjusted after its provisional construction, by means of the weight of water."

Weight of water contained in a litre as ascertained by Mr. Hassler in 1832.

In 1832 Mr. Hassler, the head of the Standards Departments in the United States, found,† upon comparison, that an original brass kilogram presented by the French Commission was equal to 15433·15902 grains of an imperial troy pound verified by Captain Kater. This value differs 0·81028 gr. from that ascertained by Professor Miller in 1844. In the same year, Mr. Hassler found‡ the contents in distilled water at its maximum density of a cubic décimètre, being the brass litre of the State Department, made by Fortin of Paris, to be 15401·33 grs. The result of a second weighing by Hassler in 1842, as stated by him in a MS. report sent to the British Government with the American standards, made the weight 15400·4826 grains, differing from the first comparison 0·8476 grain.

Comparisons in 1864 of the mètre and kilogramme du Conservatoire with the primary Metric standards.

The latest official comparisons of the French Metric standards, the primary mètre and kilogramme des Archives, and the mètre and kilogramme du Conservatoire, were made under the following circumstances:

On 5th October 1863 a Commission was appointed by the French Minister of Commerce, and composed of—

General Morin, Director of the Conservatoire	*President.*
M. Tresca, Sub-Director and Professor of Mechanics	*Members.*
M. Silbermann, Conservator of the Collection	*Members.*
M. Froment, Constructor of Instruments of Precision	*Members.*

The Commission was directed to make an official verification with the primary Metric standards, the mètre and kilogramme des Archives, of the mètre and kilogramme du Conservatoire; these latter standards being more particularly intended to be used for making comparisons of Metric standards for the different governments who adopt the Metric system.

* Bessel adds in a note—"In reference to the gramme, such a case appears already to have occurred; at least many more recent weighings agree in assigning to the water a somewhat different weight, without, however, expressing a wish for a consequent change in the weight of the gramme."

† Hassler's Report of 1832, p. 97.

‡ Ib. p. 113.

This Report, dated 5th March 1864, is signed by the four members of the Commission and by Comte de Laborde, the Director-General of the Archives. It also bears the signature of M. Behic, the Minister of Commerce, &c., as being approved, and to serve as the basis of official verifications.

The several standards to be compared are thus described:

Primary Standard Mètre des Archives.

Description of primary standard mètre des Archives.

This standard mètre is a platinum bar, without any inscription or mark whatever. Its breadth is 25 millimètres (0·984 in.); its height, 3·5 millimètres (0·138 in.). Its ends are planes perpendicular to its length, and the straight line between them should denote the true length of the mètre. It thus constitutes what is ordinarily termed a *mètre-à-bout*. The ends of the bar, when examined with a magnifying glass, show very evidently some scratches upon them (*des rayures très-marquées*), the result of friction at a former period.

The standard mètre is kept in the iron chest of the Archives. It is enclosed in a mahogany box lined with red velvet. The box has a rectangular plated label, with this inscription:—

MÈTRE
CONFORME À LA LOI DU 18 GERMINAL, AN III.
PRÉSENTÉ LE 4 MESSIDOR, AN VII.

and on the edge of the label,

FAIT PAR LENOIR.

Standard Mètre du Conservatoire.

Of the standard mètre du Conservatoire.

This standard is described as being in every respect similar to the mètre des Archives, except that the surface of each of the two ends is in a better state of preservation. Upon one of its sides and three centimetres from each of its ends, this bar bears two impressions of an oval stamp, the bottom of which is cut in grooves for three-quarters of its surface. Upon the same side, two fine lines extending respectively from the extreme edge for the length of about a centimetre from it, have formerly been made with the evident intention of indicating the middle of the measuring surface.

The box containing this standard and its inscription are precisely similar to those of the mètre des Archives.

The Primary Standard Kilogramme des Archives.

Of the primary standard kilogramme des Archives.

This is a cylinder of platinum, with the edges slightly rounded. It bears no mark nor inscription. Its dimensions were formerly determined by M. Ivon Villarceau, by means of the Gambey's special comparateur, belonging to the Conservatoire, and are as follows, at the temperature of 7·30 Cent.:—

Mean diameter	-	39·461 millimètres.
„ height	-	39·7887 „
Computed volume		48·6616 cubic centimètres.

The standard kilogram is also kept in the iron chest of the Archives. It is enclosed in an octagon box of shagreen, with a projecting cover, and lined with scarlet velvet. The box has a lock and key; two silver hooks serve to keep it close, and it bears on the top a silver plate with this inscription:—

KILOGRAMME
CONFORME À LA LOI DU 18 GERMINAL, AN III.
PRÉSENTÉ LE 4 MESSIDOR, AN VII.
FORTIN F.

Primary Standard Kilogramme du Conservatoire.

Of the standard kilogramme du Conservatoire.

This standard is also similar in every respect to the kilogramme des Archives, except that its dimensions at 7·60 C. are,

Mean diameter	=	40·403 millimètres.
„	=	40·6492 „
Computed volume	=	52·1159 cubic centimètres.

Its volume is therefore greater than that of the standard kilogramme des Archives by about 3·5 cubic centimètres.

The box in which this standard is enclosed contains also a small piece of paper, upon one side of which is a certificate that the kilogram had been compared on 18th October 1811 with the primary standard, and had been found perfectly identical, as shown by the procès-verbal. Upon the other side of the paper is a similar certificate of comparison on 19th November 1840. It would appear from the procès-verbal itself, which is preserved at the Palais des Archives, that the comparison was made with a new balance constructed by Fortin, and in air, but without any correction for the weight of air displaced. Under these conditions, the two standard weights agreed within less than two milligrams (0·03086 grain).

Before proceeding with the comparison the Commission deliberated upon the means they should use to ensure the greatest accuracy in the process.

In comparing the metres, they determined to use M. Silbermann's comparing apparatus, with certain modifications; that the comparison should be made without immersing the metres in the melting ice, but in air cooled by it to its temperature; choosing for the process the moment when this temperature should differ as little as possible from 0°.

Considering that in the comparison of the kilograms the difference of volume is the cause of numerous corrections being required, and that it might consequently be difficult to continue the ordinary comparisons of the kilogramme du Conservatoire with those presented by foreign governments for verification, the Commission determined, upon the motion of M. Tresca, that it would be preferable to construct a new platinum kilogram of the same volume, and as nearly as possible of the same weight as the kilogramme des Archives.

The construction of two such kilograms was entrusted to MM. Collot, Brothers.

One of these kilograms, to be compared directly with the primary standard kilogramme des Archives, in relation to its volume and weight, was more particularly intended for comparisons to be made with the standards of foreign governments. It is denoted as C. No. 1.

KILOGRAM, COPY C. No. 1.

This kilogram is made of platinum, and is of cylindrical form. The actual density of the platinum having been found greater than that of the kilogramme des Archives, the weight was pierced in the line of its axis, for two-thirds of its height, by a cylindrical hole one centimetre in diameter, and the hole was closed with a screw plug tightly fitted.

In the middle of the plug, which otherwise was made perfectly level with the upper face of the cylinder, there was drilled a pinhole two millimetres in diameter, to serve for definitive adjustment of the kilogram.

A pin, 22 millimetres in length, with its calibre adjusted so as exactly to fit the hole made to receive it, was inserted provisionally into the opening which it was destined ultimately to close.

The preliminary verifications of this kilogram led to a hope that it would be as nearly as possible identical with the primary kilogramme des Archives.

Actual Comparison of the two Platinum Metres.

This comparison was made in the central vestibule of the Palais des Archives. The windows of this vestibule had been opened since the morning, in order that the air of the room might be equal in temperature with the external air.

The process was carried on at temperatures very near to 0°, and the temperature of the measure under observation was each time indicated by a small mercurial thermometer held for a sufficient time upon the bar itself.

The first comparison was made on the 31st January 1864, with M. Perreaux's comparing apparatus, which had been employed for the previous comparisons. A second verification took place on 12th February in the same place, with M. Silbermann's comparing apparatus,

belonging to the collection at the Conservatoire. These instruments for comparing measures of length are furnished with microscopes and micrometers, and are constructed upon a similar principle to the microscopical comparing apparatus recently supplied to the Standards Department here.

The results of the first comparison with M. Perreaux's instrument are shown in the following table :—

A denotes the mètre des Archives, C the mètre du Conservatoire.

Mètre under observation.	Hour. A.M.	Temperature of the bar. (Centigrade.)	Divisions of the Micrometer.	
C	8 40′	+ 1·7		+ 0·0
A	8 51′	+ 1·4	+ 2·	
C	9 4′	+ 1·3		+ 0·6
A	9 19′	+ 1·3	+ 0·4	
C	9 26′	+ 0·9		— 0·5
A	9 37′	+ 0·7	+ 0·9	
C	9 45′	+ 0·9		— 0·4
			+ 3·3	— 0·3
Mean - - -		+ 1·17	+ 1·10	— 0·075
Difference - - -		- - -	0·0	— 1·175

One division of the micrometer = 0·002823 millimètre (0·00011 in.). It was found therefore that at the mean temperature of 1·17 Cent., the platinum mètre du Conservatoire was longer than the standard mètre des Archives, by 0·0033mm. (0·0001299 in.), and that its exact length was 1·0000033 mètre.

The second comparison was made between 8.40 a.m. and 10.2 a.m., on 12th February 1864, by a similar process. In M. Silbermann's instrument the metre under observation is placed upon a platinum bar which forms one of Borda's thermometers, and is intended to test the constancy of the temperature. For noting the temperature there was placed upon the metre under observation a small metal thermometer which immediately took its temperature, and the zero of which was verified the same day by placing a piece of melting ice upon the bulb of its tube.

The threads of the micromteer screw are 0·5mm. (0·01968 in.) apart. The head of the screw is divided into 500 parts, so that each division of the micrometer corresponds with a difference of length of 0·001mm. (0·00004 in.).

The result of the second comparison was that at the mean temperature of 1·30° C. the mètre du Conservatoire was 0·00328mm. (0·0001291 in.) longer than the standard métre des Archives, and its true length = 1·00000328 mètre.

The two results agreed so nearly as to guarantee the requisite accuracy ; the mean length of the mètre du Conservatoire being taken to be 1·00000329 mètre.

Comparison of the two Platinum Kilograms.

Preliminary comparison of C. No. 1 with the standard kilogramme des Archives.

The system adopted for the ultimate comparison of these two standard kilograms was principally based upon the fact of the volume of the primary kilogramme des Archives, and that of the copy C. No. 1, constructed by MM. Collot for the Observatoire, being as nearly as possible equal. It became necessary, therefore, carefully to proceed with the verification of the equality of volume of these two platinum weights.

With this object in view, their mean heights and diameters were ascertained by an instrument specially constructed for the purpose by M. Gambey, the reading of which is easily tested to one-hundredth part of a millimètre. The two standard weights were placed in the position required by means of a small pair of tongs, and were never touched with the hand of the operator. The temperature of the instrument, determined by the small metallic thermometer before mentioned, varied only from +3° to +4° Centigrade. The mean result of eight different measurements of each of the two weights, made on 12th February 1867, was as follows :

Platinum Weight.	Mean Height.	Mean Diameter.	Computed Volume.
A (kilogramme des Archives) -	39·796mm	39·495	48·7544 cubic centimètres.
C′ No. 1 - - - -	39·800	39·460	48·6729 „
A in excess - - - - - - - -			0·0815 „

It was considered that the difference of volume should be altogether disregarded, so far as it might affect any correction for the weight of air displaced, as under ordinary circumstances it would be equivalent to a loss of weight in air of 0·0105 milligram only (0·00016 grain), and the consequent correction of the weighings could never amount to more than a very small part of the loss of weight.

The actual comparisons of the weight of these two standards, the kilogramme des Archives and its copy, C′ No. 1, occupied several sittings of the Commission. The 31st January was taken up with the preliminary operations, and the subsequent verifications were made on the 3d and 12th February. M. Bianchi's balance was used, and Borda's system of weighing, and the kilogram under observation being always counterpoised by a similar weight, C′ No. 2, having the same volume.

The mode of making and recording the comparisons on these two occasions, and the results, are shown in the following tables :—

Observations made on the 3d February 1864.

Temperature at the beginning and end of the process + 6° Centigrade.

Designation of Platinum Weights.	Divisions of the Index Scale of the Balance.			
	Extreme oscillations of the Index Needle.		Mean resting point of each observation.	Mean of all the observations.
A + 2·5 milligr.	+ 0·40	— 1·50	— 0·55	— 0·65
	— 0·05	— 1·30	— 0·67	
	— 0·20	— 1·05	— 0·62	
	— 0·40	— 1·00	— 0·70	
	— 0·50	— 0·90	— 0·70	
C′ No. 1 + 2·5 milligr.	— 0·10	— 2·50	— 1·30	— 1·37
	— 0·50	— 2·30	— 1·40	
	— 0·80	— 2·05	— 1·42	
	— 0·90	— 1·80	— 1·35	
	— 1·05	— 1·70	— 1·37	
Difference, C′ No. 1 heavier than A				— 0·72

The value of one division of the index scale was ascertained by removing the weight of 0·5 milligram from the pan after the five last observations, the following being the result :—

Designation of Platinum Weights.	Divisions of the Index Scale of the Balance.			
	Extreme oscillations of the Index Needle.		Mean resting point of each observation.	Mean of all the observations.
C′ No. 1 + 2· milligr.	+ 0·65	— 1·20	— 0·275	— 0·28
	+ 0·35	— 1·00	— 0·825	
	+ 0·20	— 0·75	— 0·275	
	+ 0·10	— 0·65	— 0·275	
	+ 0·00	— 0·50	— 0·250	

As a diminution of weight of 0·5 milligram corresponded with a difference in the resting point of 1·09 division (1·37 — 0·28), it followed that one division of the index scale was equivalent to 0·4587 milligr. (0·00708 grain), and the difference in weight between the two kilograms was therefore 0·72 × 0·4587 = 0·33 milligram.

The kilogram C′ No. 1, appeared therefore to be too heavy by 0·33 milligram (0·0051 grain).

Observations made on the 12th February 1864.

Temperature at the beginning of the process + 1·0° C.
„ at the end „ „ + 1·5° C.

Designation of Platinum Weights.	Divisions of the Index Scale of the Balance.			
	Extreme oscillations of the Index Needle.		Mean resting point of each observation.	Mean of all the observations.
A + 2· milligr.	+ 0·5	— 0·5	0·00	— 0·01
	+ 0·4	— 0·4	0·00	
	+ 0·3	— 0·4	— 0·05	
	+ 0·5	— 0·5	0·00	
	+ 0·6	— 0·6	0·00	
C′ No. 1 + 2· milligr.	— 2·8	— 1·1	— 1·95	— 1·96
	— 2·7	— 1·3	— 2·00	
	— 2·3	— 1·4	— 1·85	
	— 2·4	— 1·6	— 2·00	
	— 2·3	— 1·7	— 2·00	
Difference, C′ No. 1 heavier than A				— 1·95

The value of one division was found as before by taking one of the two milligrams from the pan which also contained C′ No. 1 ; this diminution of weight occasioned a difference in the mean resting point 2·70 divisions, showing one division of the index scale to be equivalent to 0·37 milligr. (0·00570 grain), and the difference between the two kilograms to be 0·72 milligram (0·01111 grain).

It was considered that during the comparison on 3d February, the temperature was not sufficiently near to 0° for the result to be taken as conclusive, although from the fact of the identity in volume of the two standards, atmospheric influences could have but an insignificant effect. The second comparison on 12th February having been made at a temperature nearly approaching 0°, and under every condition which could be desired for accuracy, the Commission determined that the result of the first comparison should be looked upon merely as a valuable confirmation of that arrived at on the second occasion, and that the true weight of the new platinum standard C′ No. 1, was 1·00000072 kilogram.

The pin was therefore permanently fixed in the hole made to receive it; the stamp of the Conservatoire was lightly impressed upon the head of the pin, together with a special stamp, No. 1, to indicate that it is the first in order of date amongst the kilogram weights of the same volume as the kilogramme des Archives.

This determination being intended to serve as a basis for ulterior verifications, the proceedings were then closed and the procès-verbal signed by the several officers.

M. Saigey (edit. 1856, p. 64) states that the brass kilograms for the Central Bureau at Paris and for the Mint were constructed from the brass standard kilogram of the Ministère de l'Intérieur, although frequent reference to the platinum standard was made during its verification.

That in 1835 comparisons of the two kilograms of the Central Bureau and of the Mint respectively with that of the Ministère de l'Intérieur were made by him. The kilogram of the Mint was found 64 mgrs. too heavy, and although it ought immediately to have been adjusted to its true weight, it was nevertheless kept unaltered. The kilogram of the Central Bureau was found about 130 mgrs. (= 2·00616 grain) too heavy, and is stated to have since been corrected in 1840. It would seem to have been copied from the platinum kilogramme des Archives without reduction to a vacuum, and thus from ignorance of the theory of weighing, kilograms were issued to the public for trade purposes too heavy by $1\frac{1}{3}$ decigrams.

M. Saigey adds, that as the density of iron weights is about 7·2, the loss in air of an iron kilogram ought to be about 180 mgrs.; and it follows that weighed in air, an iron kilogram is 29 mgrs. lighter than a brass kilogram, and 92 mgrs. lighter than a platinum kilogram, all three weights being equal in a vacuum.

Summary of comparisons of official Metric standards.

It may be convenient here to show a tabular summary of the results of the comparisons from time to time of the principal official copies of the French standards with the primary Metric standards, the platinum mètre and kilogramme des Archives.

—	———	Date of Comparison.	Relation to the Standard at 0° C. Temperature, the Weights reduced to a Vacuum.	Remarks.
See p. 23	Brass Mètre de l'Observatoire, originally constructed for regulating the measures throughout France - - -	In 1799 - -	Exactly equal.	
„ p. 24	Do. Do.	11 Sept. 1850 -	Do.	
„ p. 23	Brass Kilogramme de l'Observatoire, subsequently called Type Laiton du Ministère de l'Intérieur, constructed for regulating the weights throughout France.	In 1799 - -	Do. - - -	In ordinary air $1\frac{2}{3}$ French grain or $88{\cdot}4^{mgr}$; less than the standard. This kilogram was intended to be alone used for all comparisons in air, and as representing the primary standard of weight.
„ p. 25	Do. Do.	11 Sept. 1850 -	Assumed to be exactly equal.	More correctly stated as $+2{\cdot}45^{mgr}$ or 0·03780 gr. in a vacuum, and in air ($t = 18{\cdot}7°$ C., $b = 755{\cdot}64^{mm}$) as $88{\cdot}6^{mgr}$ or 1·36732 troy gr. less than the primary platinum standard.
„ p. 24	Platinum mètre de l'Observatoire, for scientific comparisons - -	1799 - -	Do.	
„ p. „	Do. Do.	26 Jan. 1806 -	+ less than $0{\cdot}00166^{mm}$	(=0·0000656 in.) or within probable errors of observation, and therefore considered as nearly equal as possible.
„ p. „	Do. Do.	11 Sept. 1850 -	$+0{\cdot}003^{mm}$ - -	(0·00012 in.) M. Saigey states, that on one occasion, when this platinum metre was being examined by some Ordnance Engineers it was caught by the tail of a coat and thrown to the ground, and one of its ends damaged.—*Pratique des Poids et Mesures*, 1856, p. 116.
„ p. „	Platinum kilogramme de l'Observatoire for scientific comparisons -	In 1799 - -	Exactly equal.	
„ p. „	Do. Do.	6 Jan. 1805 -	+ less than 1^{mgr} -	(0·01543 gr.) and therefore considered as nearly equal as possible.

—	——	Date of Comparison.	Relation to the Standard at 0° C. Temperature, the Weights reduced to a Vacuum.	Remarks.
See p. 26	Platinum kilogramme de l'Observatoire for scientific comparisons -	16 Feb. 1812 -	+ 6 to 8^{mgr} - -	(0·09259 to 0·123456 gr.)
„ p. 24	Do. Do.	May 1837 -	+ 4·48^{mgr} - -	(0·06913 gr.)
„ p. „	Do. Do.	Sept. 1844 -	Exactly equal.	After adjustment by M. Arago, but more correctly stated as exactly equal.
„ p. „	Do. Do.	11 Sept. 1850 -	— 2·6^{mgr} - -	(0·04012 gr.)
„ p. 26	Do. Do.	5 Feb. 1859 -	— 0·28^{mgr} - -	(0·00432 gr.)
„ p. 25	Platinum mètre du Conservatoire.	1799 - -	In every respect similar.	
„ p. „	Do. Do.	May 1852 -	No alteration -	Compared at 10° C. and no sensible difference found.
„ p. 31	Do. Do.	12 Feb. 1864 -	+ 0·00329^{mm} -	(0·00013 inch.)
„ p. 30	Platinum kilogram du Conservatoire - -	1799 - -	Identical.	
„ p. „	Do. Do.	18 Oct. 1811 -	Do. - - -	In ordinary air, within 2^{mgr}
„ p. „	Do. Do.	19 Nov. 1840 -	- - -	(0·03086 gr.)
„ p. 25	Do. Do.	May 1852 -	+ 3·38^{mgr} - -	(0·05216 gr.)
„ p. 26	Do. Do.	5 Feb. 1859 -	+ 1·982 - -	(0·03058 gr.)
„ p. 27	Do. Do.	April & May 1860	+ 2·067 - -	(0·03189 gr.)
„ p. 32	Do. C′ No. 1 -	12 Feb. 1864 -	+ 0·33^{mgr} - -	(0·0051 gr.)

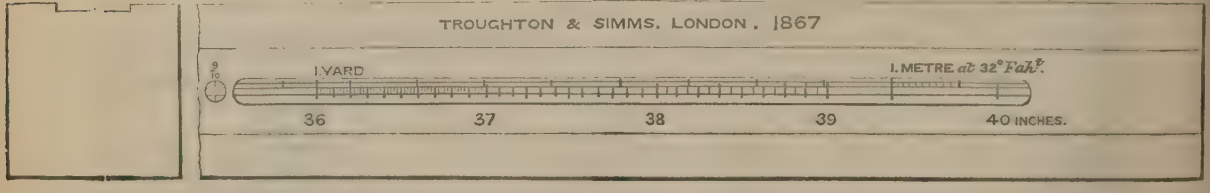
No other official standards than the metre and kilogram.

It will be seen that no Metric standards have been described except the two standard units of Metric length and weight, the metre and the kilogram. There is no French metric standard of measures of capacity, it being stated* that it is unnecessary that there should be one, since the *litre*, the unit of measure of capacity, is a cubic décimètre, and a cubic décimètre of distilled water at its maximum density is declared to weigh in a vacuum exactly a kilogram. The kilogram, therefore, supplies the place of a standard unit of capacity.

Copies of the Metric standards deposited in the Standards Department of the Board of Trade.

It may be here stated that the new subdivided imperial standard yard, with a subdivided metre marked upon the same bar, which has been constructed by Messrs. Troughton and Simms, in pursuance of the Minute of the late Standards Committee, dated 15th June 1866 (referred to in Appendix D to paper II.), was deposited at the Standards Department on 30th March 1868. The length of the metre has been laid down from the platinum line standard metre of the Royal Society, originally compared and verified with the primary mètre des Archives by M. Arago. It is proposed to make a further comparison in the Standards Department of this new metre with the Royal Society's platinum metre, and of its subdivisions by means of the new and improved comparing apparatus, the fixing of which in the Tower Room was completed also on 30th March 1868. The results of this comparison will be shown in a subsequent paper on the reverification of the official standards of length.

The bar upon which the yard and the metre are worked is of Baily's metal, $42\frac{1}{2}$ inches long, and 1 inch high and wide. It is engraved "Troughton and Simms, London, 1867." The yard is divided into 3 feet, 16 nails, and 36 inches; 4 additional inches are marked, making 40 inches in all, the first of these being divided into hundredths of an inch, the second into twelfths, and the third into sixteenths. The metre is divided into decimetres, and the last decimetre into centimetres, an additional centimetre is divided into millimetres. The divisions, up to 36 inches, are marked upon gold studs let into and made level with the surface of the bar, and by very fine lines cut across two other lines, the gold studs being in the middle of the breadth of the bar, and in a trench depressed about $\frac{1}{25}$ inch below its upper surface. There is a slip of gold let into the bar extending a little beyond each line defining 36 and 40 inches, upon which the measure of a yard, of a metre, and of the smaller subdivisions are marked.



Showing transverse section of the bar.

Showing the right-hand end of the upper surface of the bar, with the lines defining the yard and metre, and smaller subdivisions.

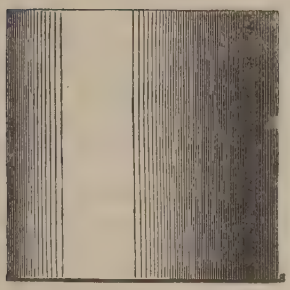
There are now two standard kilograms deposited in the Standards Department, one of platinum, procured at Paris, in 1844, from M. Gambey by Professor Miller, and described by him† as "resembling in form the kilogramme des Archives, except that it is not quite so large, in consequence of the greater density of the metal of which it is composed. The cylindrical surface and the ends are very accurately worked. The metal of which it is made is greatly superior to that of which the standard pound and its copies are constructed, as not the slightest indication of any defective place can be observed on its surface." This platinum kilogram was designated by Professor Miller as ℭ. He found its density to be 21·13791, and that in a vacuum it was 0·02412 grain, or 1·56 milligram lighter than the French standard. Its weight in terms of the imperial standard was 15432·32653 grains. This platinum kilogram was transferred by the Astronomer Royal to the Standards Department on 2d August 1867.

* M. Silbermann, 1852, in Report of Secretary of United States on Weights and Measures, p. 149.

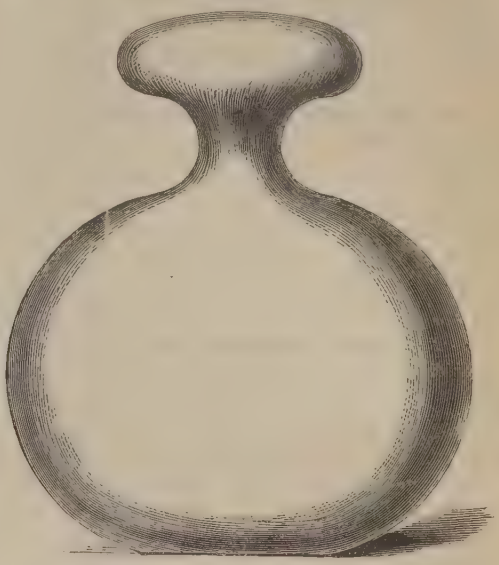
† Construction of Standard Pound, p. 876.

The other kilogram is of gilt gun metal, and was constructed by Mr. Oertling for the use of this Department. It is designated by Professor Miller* as the Exchequer kilogram, or 𝔎. He found its density to be 8·32910, and that in a vacuum it was 0·04696 grain, or 3·04 milligrams less than the French standard 𝔄, and 0·02284 gr., or 1.47^{mgr} less than 𝔈. In air ($t = 18·7°$, $b = 755·64^{mm}$) 𝔎 displaces 2·2211 grains, and as the French platinum standard — 1·4 gr. of platinum, displaces 0·89981 gr. 𝔎 is therefore 1·3683 gr., or 88·66^{mgr} lighter than the French standard.

There is no mark or engraving upon either of these two kilograms of the Standards Department. Their form and size are as follows :—



Platinum Kilogram. Cylindrical shape.
Height and diameter = 1·55 inches.



Gilt Gun-Metal Kilogram. Spherical shape, with a knob.
Greatest diameter = 2·71 inches. Height = 3·125 inches.

Local Standards of French Metric Weights and Measures.

It has been stated that there is no other standard of Metric weights and measures other than the mètre and the kilogram.

Nor is there any legal or specific standard of any multiple or part of either of the two primary standard units of length and weight, which themselves bear no subdivisions. The weights and measures supplied by Government for the use of the several bureaux de vérification, and which thus serve as local standards for regulating commercial weights and measures, are constructed from the two commercial standards, the official brass mètre and kilogram, copies more or less exact being made of these two standards, and the other weights and measures being multiples and parts of these copies, or derived from them. Their construction is entrusted to mechanicians of repute, and all must be in the first instance verified by comparison with the copies of the two primary standards.

A complete collection of the weights, measures, and apparatus furnished to each bureau de vérification in France, as reported on 6 March 1852, by General Morin and M. Silbermann to the Agent of the Government of the United States, is as follows :

Measures of Length.

One brass mètre, graduated in its whole length, used as a standard.

One wooden mètre, bound with iron at its two ends.

One double décimètre.

One dékamètre (surveyor's chain), with 10 measuring pins.

One chain mètre for measuring the circumference of fagots and bundles of firewood.

Measures of Capacity.

Brass standards with discs of ground glass.

One double dékalitre	20	litres.
„ dékalitre	10	„
„ demi-dékalitre	5	„
„ double litre	2	„
One litre	1	litre.
„ demi-litre	0·5	„
„ double décilitre	0·2	„
„ décilitre	0·1	„
„ demi-décilitre	0·05	„
„ double centilitre	0·02	„
„ centilitre	0·01	„

Specimens in Wood of Dry Measures of Capacity.
For Grain.

One hectolitre	100	litres.
„ demi-hectolitre	50	„
„ double dékalitre	20	„
„ dékalitre	10	„
„ demi-dékalitre	5	„
„ double litre	2	„
„ litre	1	„
„ demi-litre	0·5	„
„ double décilitre	0·2	„
„ décilitre	0·1	„
„ demi-décilitre	0·05	„

For Coal Measures (with feet).

One hectolitre	100	litres.
„ demi-hectolitre	50	„

Specimens in legal form of the Pewter Measures of Capacity in use for Liquids.

First series (cylindrical).

One double litre	2	litres.
„ litre	1	„
„ demi-litre	0·5	„
„ double décilitre	0·2	„
„ décilitre	0·1	„
„ demi-décilitre	0·05	„
„ double centilitre	0·02	„
„ centilitre	0·01	„

Second series (with handles).

One double litre	2	litres.
„ litre	1	litre.
„ demi-litre	0·5	„
„ double décilitre	0·2	„
„ décilitre	0·1	„
„ demi-décilitre	0·05	„
„ double centilitre	0·02	„
„ centilitre	0·01	„

* Construction of Standard Pound, p. 936.

Third series (with handles and covers).

One double litre	2	litres.
„ litre	1	litre.
„ demi-litre	0·5	„
„ double décilitre	0.2	„
„ décilitre	0·1	„
„ demi-décilitre	0·05	„
„ double centilitre	0·01	„

Specimens in Tin Plate of Measures of Capacity for Milk and Oil.

First series, for milk and military rations.

One double litre	2	litres.
„ litre	1	litre.
„ demi-litre	0·5	„
„ double décilitre	0·2	„
„ décilitre	0·1	„
„ demi-decilitre	0·05	„
„ double centilitre	0·02	„
„ centilitre	0·01	„

Second series, for lamp oil, marked B.

One double litre	2	litres.
„ litre	1	litre.
„ demi-litre	0·5	„
„ double décilitre	0·2	„
„ décilitre	0·1	„
„ demi-décilitre	0·05	„
„ double centilitre	0·02	„
„ centilitre	0·01	„

Third series, for table oil, marked M.

One double litre	2	litres.
„ litre	1	litre.
„ demi-litre	0·5	„
„ double décilitre	0·2	„
„ décilitre	0·1	„
„ demi-décilitre	0·05	„
„ double centilitre	0·02	„
„ centilitre	0·01	„

Brass Standard Weights (with knobs).

One weight of 20 kilograms	20,000	grams.
„ 10 „	10,000	„
„ 5 „	5,000	„
Two double kilograms, each	2,000	„
Two weights of 1 kilogram, each	1,000	„
One demi-kilogram	500	„
One double hectogram	200	„
Two hectograms, each	100	„
One demi-hectogram	50	„
One double dékagram	20	„
Two dékagrams, each	10	„
One demi-dékagram	5	„
Two double grams, each	2	„
One gram	1	gram.
„ five décigrams	0·5	„
„ two décigrams	0·2	„
„ decigram	0·1	„
„ five centigram	0·05	„
„ two centigrams	0·02	„
„ centigram	0·01	„
„ five milligrams	0·005	„
Two two milligrams, each	0·002	„
One milligram	0·001	„

Nest of Weights,

forming altogether 1 kilogram, and divided into—

500 grams.
200 „
100 „
100 „
50 „
20 „
10 „
10 „
5 „
2 „
2 „
1 „

Cast-iron Weights.

50 kilograms, in trapezoidal form.
20, 10, 5, 2, 1 „ in pyramidical form.
500 grams.
200 „
100 „
50 „

The apparatus of verification consists of :—

A balance capable of weighing 50 kilograms, sensitive to	0·02 grams.
A balance capable of weighing 1 kilogram, sensitive to	0·01 „
An assay balance capable of weighing 20 grams, sensitive to	0·001 „
A hydrostatic balance, capable of weighing 2 kilograms, sensitive to	0·01 „

With the assay balance for the verification of small weights, there are two series of weights, of 20, 10, 10, 5, 2 grams, and 1 gram; also a series of the subdivisions of the gram, and, finally, two supernumerary pans.

With the hydrostatic balance, there is a copper bucket for weighing in water. This balance serves also to determine the standard of alloy employed in the fabrication of pewter measures of capacity.

A hopper attached to an oaken bench is used to verify wooden measures of capacity, and a strike to remove any surplus of the ascertained quantity of seed, with which the measures are tested.

The seed used for this purpose is generally rape seed, or any other may be used the form of which is round, small, and regular.

On the bench a screw press is fastened, which is intended to be used in stamping the measures; for this purpose it is accompanied by a box containing a beaked iron and two small cushions, with two keys to tighten the screw nuts.

Inspectors, who, in their rounds of inspection, can not carry the above-mentioned cumbrous apparatus with them, are provided merely with a box or case, containing the following articles, viz. :—

A wooden mètre, in two parts.

A double décimètre, of boxwood.

A copper gauge, with projecting division marks, for the verification of the dimensions of the wooden measures of capacity, from the double hectolitre to the demi-décilitre.

Two balances, one a steelyard, for weights from 20 to 2 kilograms; the other a balance with equal arms for the kilogram and its subdivisions.

An iron press, for stamping.

A heavy hammer.

Seven samples of stamps.

A kilogram of nest weights, similar to the one above mentioned.

A kilogram, with knob.

A more detailed description of the contents of the inspectors' box of apparatus will be found at page .

To this collection are added the official ordinances and instructions for the fabrication and verification of weights and measures, accompanied by an atlas representing all the weights and measures in their legal form, as detailed in the above list.

Under article 6 of § 1 of the Royal Ordonnance of 17 April 1839, the local Metric standards in the custody of the several vérificateurs of weights and measures are directed to be verified once in every ten years. In point of fact, no such verification has yet taken place. It would appear from General Morin's letter of 17 December last that this verification is now being carried out.

No re... cation ... local ... standards yet made.

With M. Silbermann's Report of 6 March 1852, which has been already referred to, there was also transmitted by the French Government to the Government of the United States a complete collection of copies of the Metric standards, as well as of the local standard weights and measures, and of other apparatus furnished to each local bureau, all of which are specified in the above list. These weights and measures had all been previously verified at the Conservatoire, and a statement of the mode and result of the several comparisons is also included in M. Silbermann's Report. As this appears to be the only published statement of the process of verification of the local Metric standard weights and measures in France, it may be here described.

The graduated brass metre, the wooden metre, and the other measures of length were compared and stamped in the bureau de vérification, and were therefore considered to have the exactness required by law. The mode of verifying graduated measures of length in the bureaux will be herein-after described. (See page 64.) It consists merely in placing the measure in juxtaposition to the local standard, and determining by the eye that the several defining lines coincide. No statement appears of the actual mode by which the accuracy of the several subdivisions of the metre had been originally ascertained and verified, nor does there appear to be any authoritative standard of any other measure of length than the unit metre.

Brass standard weights.

The comparison of the brass standard weights was based upon the brass gilt standard kilogram, No. 6, verified for the United States with the primary standard, and found in a vacuum = 1,000·00291 grams. It was considered that all the brass weights were of the same density and would balance equally in a vacuum and in air, and therefore that no correction was required for the weight of the volume of air displaced. To aid the comparisons five other brass kilograms had also been verified, together with No. 6, and their true weights in a vacuum were determined as follows:—

No. 1 = 1,000·00291 grams.
No. 2 = 1,000·00690 „
No. 3 = 1,000·00890 „
No. 4 = 1,000·00590 „
No. 5 = 1,000·00990 „
No. 6 = 1,000·00291 „

All the operations of weighing were performed with the two balances presented to France by the Government of the United States. Both balances were found to be sensitive to 0·0005 gram, the smaller when loaded with 1 kilo. and the larger with 10 kilo.

The comparisons of the brass weights, and their results, were as follows:—

No. 1 of 1 kilo.	= No. 6+0·0040 gram.	or =	1,000·0069 gram.
No. 2 „	= No. 6+0·0020 gram.	=	1,000·0049 „
No. 1 of 2 kilo.	= No. 6+No. 1−0·076 gram.	=	1,999·9298 „
No. 2 „	= No. 6+No. 1−0·064 gram.	=	1,999·9418 „
5 kilo.	= No. 2+No. 3+No. 4+No. 5+No. 6−0·020 gram.	=	5,000·0145 „
10 kilo.	= 5 k.+No. 2+No. 3+No. 4+No. 5+No. 6−0·088 gram.	=	9,999·9610 „
20 kilo.	= 10 k.+5 k.+2 k.+2 k.+No. 2 of 1 k.+0·040 gram.	=	19,999·888 „
5+2+1+1 hectog. + 5+2+1+1 decag. + 5+2+2+1 gram.	= No. 6+0·002 gram.	=	1,000·0049 „
Nest kilogram	= No. 6+0·002 gram.	=	1,000·0049 „

The fractions of a gram were verified separately, the precise mode not being stated; and the fractions of the larger series were again verified by a gram adjusted by Fortin. The fractions added together ought exactly to make a gram. Their value was found to be equal to 1·00020 gram, as determined with a gram balance made by Devrine at the begining of this century, and by which a division of 1 millimetre in length marks $\frac{1}{25}$ of a milligram. With the naked eye a difference of $\frac{1}{4}$ of a division, equal to 0·01 mgr., could be observed.

The cast-iron weights were only subjected to the ordinary verification at the bureau, and their correctness thus ascertained within the limits prescribed by law.

In describing the verification of the Metric measures of capacity, M. Silbermann commences with the definition of their unit, the litre. It is, in relation to the metre, a cubic decimetre. This is its legal definition, and, strictly speaking, the legal unit measure of capacity, the litre, should be a vessel the internal measure of which at the temperature of melting ice, or 0° Centig., is a cubic decimetre, or a cube each side of which is exactly a decimetre.

In order to preserve a certain fixed relation between the units of the measures of length and of capacity, as well as of length, in the French Metric system, whilst the measure of a cubic decimetre legally constitutes the litre or unit of capacity, the weight of a cubic decimetre of distilled water, taken at its maximum density, or at the temperature of 4° Centig. and in a vacuum, constitutes a kilogram, or 1,000 grams, the unit of Metric weight. Strictly speaking, therefore, the kilogram should have been derived from the metre, the fundamental Metric unit, through the litre, the measure of a cubic decimetre.

But practically derived from the kilogram.

But practically this has not been done, and the process has been reversed. In the original construction of the kilogram, though it was based upon the measure of a cubic decimetre of water, no such standard measure appears to have been then made, nor standard litre ever been constructed. The kilogram supplies the place of this unit. A standard kilogram has been made from which the litre is derived, and instead of being actually a measure of a cubic decimetre, derived from the metre according to its legal definition, the litre is practically derived from the kilogram, and is really nothing more than a measure of capacity, holding a kilogram weight of distilled water at 4° C.

In fact, it has been found impracticable to carry out the legal conditions for determining the relations of the units of measures of capacity and of weight to the metre and to each other; these conditions being the temperature of 0° C. for the measure of capacity, and of 4° C. for the water contained in it, and both being in a vacuum.

being the measure of its weight of distilled water.

In the verification of the litre, thus made dependent upon the measure of a kilogram weight of distilled water at 4° C., it has been found necessary to determine the proper corrections relative to the temperature of the water, the loss of weight in the air, the moisture of the air, and the expansion of the vessels, and for this purpose a table of corrections has been drawn up, under the direction of the French Government, by M. Coriolis, member of the Institute.

Table of corrections for a litre.

Corrections of temperature of a litre.

Degrees Centigrade.	Weight of a Litre of Water.	Deficiency of a Kilogram of Water.
		Grams.
0	998·754	1·246
1	999·870	1·130
2	998·971	1·029
3	999·057	0·943
4	999·132	0·868
5	999·195	0·805
6	999·245	0·755
7	999·283	0·717
8	999·307	0·693
9	999·320	0·680
10	999·320	0·680
11	999·308	0·692
12	999·285	0·715
13	999·249	0·751
14	999·200	0·800
15	999·139	0·861
16	999·067	0·933
17	998·984	1·016
18	998·889	1·111
19	998·782	1·218
20	998·664	1·336
21	998·535	1·465
22	998·394	1·606
23	998·243	1·757
24	998·080	1·920
25	997·905	2·095
26	997·720	2·280
27	997·524	2·476
28	997·318	2·682
29	997·101	2·899
30	996·880	3·120

The table assumes the barometrical pressure to be constant, and at the normal height of 760^{mm} at 0° degree of temperature; the hygrometrical state of the air at 72° of Saussure, corresponding to 0·5 of the maximum tension of the vapour contained in the air for the temperature of the observation; the cubic expansion of the brass of which the measures, weights, and counterpoises are constructed is taken as $3 \times 0{\cdot}00002108 = 0{\cdot}00006324$ for 1° C.; and finally for the expansion of water, that given by Hälström has been adopted for each degree of temperature between 0° and 30° Centigrade.

In the first column of the table is found the temperature of water; in the second the weight of a litre of water at 10°; and in the third the corresponding loss of weight to be placed in the pan in which the counterpoise of a kilogram has been previously placed, in order to replace it by its weight of water.

This table is stated to secure an exactness of less than 5 milligrams for the capacity of the litre, and to be an exactness much greater than is necessary in practice, and even sufficient for theoretical purposes. It was employed in the following verifications of the Metric measures of capacity.

Mode of adjustment of measures of capacity.

M. Parent, balance maker to the French Government, employed the following method for adjusting the measures of capacity. His practice was to take care during their construction to make them a few fractions of a cubic centimetre smaller than the legal capacity, and this would be shown by the overflowing of the water contained in and transferred from a standard measure. He made the final adjustment by the weight of water contained in the measure, and, the capacity being too small, the weight of water would necessarily be less than that given in the preceding table. Multiplying the difference between the two weights by 8·5, the approximate density of brass, would give the weight of the brass to be removed from the interior of the vessel as occupying the place of the additional quantity of water required. About seven times the weight of the difference was removed by the scraper, leaving the remainder to be removed by emery paper or any other material for polishing, and thus to allow further correction.

Actual verification of the Capacity of the Standard Litre sent to the United States Government.

Actual verification of standard litre sent to United States.

This brass measure, which was made by Gambey, when covered with a disc of ground glass, surmounted by the standard kilogram No. 6, and the additional weight of 0·792 gram., and then placed in one of the pans of the balance, exactly balanced the other pan loaded with a similar litre, covered with its disc and another kilogram.

The first pan was then unloaded, and for the kilogram No. 6 was substituted distilled water poured into the litre, taking care to remove with a feather any bubbles of air adhering to the inner sides of the measure. The temperature of the water was then ascertained to be 12·2°. The glass disc was slid along the edge of the vessel, and the surplus water cautiously removed by means of a small tube, care being taken not to spill it on the outside and to avoid any heating with the hand. The measure thus prepared was replaced in the pan of the balance. In accordance with the preceding table the cubic decimetre or litre of water at 12·2° should counterbalance a weight in brass of 999·2778 gram., its loss being 0·7222 gram. After having added this amount of loss it was found necessary to add 0·863 gram. in order to complete the equilibrium, thus showing the capacity of the litre under comparison to be deficient by this amount of the due weight of the litre of water at 4°.

In determining the result, the following quantities counterbalanced each other:—

1,000·00291 gram. + 0·792 gr. = the measure of water at 12·2°, whence the water at 4° + 0·7222 gr. = 1,000·000,291 + 0·7222 gr. + 0·863 gr. + 0·792 − 0·863 gr. or 999·93191 gr.

1,000 grams of water at 4° are equal to a litre, and 999·93191 gr. are equal to 0·99993191 litre.

Verification of the Series of Brass Standard Measures of Capacity.

Verification of series of brass measures.

This series is composed of 11 measures. All were submitted to the process described above, with the following results:—

The double dekalitre (water at 13°·5; correction 15·510 gram.)

Water + 15·510 gr. = 19,999·888 − 0, or 19,999·888 gr.

Actual capacity of the 20 litre = 19·999888 litre.

The dekalitre (water at 15°; correction 8·610 gr.)

Water + 8·610 gr. = 9,999·961 − 2·497 or 9,997·464 gr.

Actual capacity of the 10 l. = 9·997464 l.

The half dekalitre (water at 14°·5; correction 4·152 gr.)

Water + 4·152 gr. = 5,000·145 − ·025 or 4,999·9895 gr.

Actual capacity of the 5 l. = 4·9999895 l.

The double litre (water at 14°·3; correction 1·637 gr.)

Water + 1·637 gr. = 1999·9298 − 0·412, or 1999·5178 gr.

Actual capacity of the 2 l. = 1·9995178 l.

The litre (water at 14°·0; correction 0·800 gr.)

Water + 0·800 gr. = 1000·009 − 0·299, or 999·7019 gr.

Actual capacity of the 1 l. = 0·9997019 l.

The half litre (water at 13°·5; correction 0·387 gr.)

Water + 0·387 gr. = 500·000 − 0·123, or 499·878 gr.

Actual capacity of the 0·5 l. = 4·99878 l.

The double décilitre (water at 130·5; correction 0·155 gr.)

Water + 0·155 gr. = 200·000 − 0·135, or 199·865 gr.

Actual capacity of the ·2 l. = 0·199865 l.

The décilitre (water at 13°·5; correction 0·078 gr.)

Water + 0·078 gr. = 100·000 − 0·042 or 99·958 gr.

Actual capacity of the 0·1 l. = 0·099958 l.

The demi-décilitre (water 13°·5; correction 0·039 gr.)
Water + 0·039 gr. = 50·000—0·001, or 49·999 gr.
Actual capacity of the 0·05 l. = 0·49999 l.
The double centilitre (water at 13°·5; correction 0·016 gr.)
Water + 0·016 gr. = 20·000—0·006, or 19·994 gr.
Actual capacity of the 0·02 l. = 0·019994 l.
The centilitre (water at 13°·5; correction 0·008 gr.)
Water + 0·008 gr. = 10·000 — 0, or 10·000 gr.
Actual capacity of the 0·01 l. = 0·010000 l.

The three series of pewter measures of capacity, each of 8 measures, being only the usual legal forms for liquids, were not verified anew, having been compared and stamped in the usual manner by the vérificateurs.

The three series of tin measures for milk, table oil, and lamp oil, respectively, underwent no other verification than by the vérificateur.

And the wooden measures of capacity were verified in like manner, all bearing the legal stamp of the vérificateur.

The mode of official comparison and verification by the vérificateur will be found described in detail in a later part of this paper.

Metric weights and measures demanding great accuracy are not offered for local verification, for this reason, that the existing bureaux are incompetent to verify them; and hitherto no attempt has been made to establish a bureau where such accurate comparisons could be made. Persons wishing to procure perfectly accurate weights and measures are thus compelled to trust to manufacturers who have the highest reputation for accuracy. But as these manufacturers cannot themselves either construct or verify the weights and measures supplied from their place of business, everything ultimately depends upon the pains taken by the workman employed, and upon the accuracy of standards liable themselves to get out of order from constant use.

Construction, Verification, and Inspection of French Metric Weights and Measures.

During the period of the French Revolution, when the National Assembly, by the Decree of 15 March 1790, abolished all the existing rights and powers relating to the regulation of weights and measures in France as being tainted with feudality, they left to the municipal authorities to provide thenceforward for the gratuitous comparison and verification of weights and measures. By a further decree of 19 July 1791, the duty of inspecting weights and measures was cast upon the officers of police.

The decree of 1 August 1793, which fixed the metre as the fundamental unit of the new system of weights and measures, charged the Academy of Sciences and the Committee of Public Instruction with the construction of the new standards, including those to be sent to each department, and to be entrusted in each chief town to a fit person, to be appointed by the executive authorities.

Special officers for executing the duties of comparing and verifying weights and measures throughout France, were first instituted by the National Convention, under the law of 18 Germinal, An III. (7 April 1795), by which the new Metric system was definitively established. The arrangements of the several details for carrying out this new system were entrusted to a temporary commission composed of three members, to act under the authority of the Committee of Public Instruction. Vérificateurs were to be appointed in each district, their number and duties to be determined by the temporary commission. Practically their functions were limited to the verification and stamping of weights and measures brought to them for comparison. The inspection of weights and measures was continued in the hands of the municipal authorities and the police.

A further step for establishing uniformity of weights and measures in France was taken by the Directory in the Decree of 19 Germinal, An VII. (8 April 1799), which laid down the following principles upon which all the weights and measures' laws have since been based:—1. That no weight or measure other than those enjoined by the law of 7 April 1795, and verified and marked with the Government stamp, be allowed for the purposes of buying and selling or of trade. 2. That every unstamped weight or measure, whether old or new, be considered false and illegal, and dealers selling by it, or having it in their possession, be prosecuted. It will subsequently be shown that Article 479 of the Penal Code, dated 20 February 1810, established a distinction between the punishment for false and for defective weights and measures.

Inspectors appointed in 1801, and abolished in 1819.

A consular decree of 17 June 1801, after reciting the difficulties which had been experienced in finding properly qualified persons to discharge the duties of vérificateurs, imposed these duties upon the sous-préfets, and authorized them to employ persons to assist them, whose remuneration was to be fixed by the Minister of the Interior. By the same decree, the Minister of the Interior was directed to appoint 25 inspectors, one for at least four departments, at an annual salary of 5,000 francs each, very large pay for that period. Their duties consisted in frequently going round their several districts to see that the regulations of the Metric system were duly carried out, and that the vérificateurs and officers of police did their duty properly. The offices of these inspectors were abolished in 1819, their duties being in fact executed by the chief vérificateur in each department.

More extended duties of inspection imposed on the vérificateurs in 1825.

It was soon found impracticable for the sous-préfets to discharge the arduous duties of verification, which were in fact left to their assistants. But it was not until 1825 that these functionaries, who actually performed the duties of vérificateurs, were legally recognized as such. A Royal Ordonnance of 18 December 1825 declared—

Art. 1. That the préfets and sous-préfets should continue to exercise a supervision over the uniformity and legality of commercial weights and measures, the inspection of which should devolve upon the vérificateurs acting under their orders, and appointed by the préfets.

Art. 2. That the municipal authorities should assist the vérificateurs in the discharge of their duties, and should prosecute before the tribunals, either by virtue of their own office, or on the requisitions of the vérificateurs, all dealers offending against the weights and measures laws.

Art. 3. That vérificateurs should be appointed for every arrondissement.

Art. 8. That the vérificateurs should be appointed, and might be dismissed by the préfets, with the approval of the Minister of the Interior.

Art. 9. That the pay of the vérificateurs should be regulated by the Minister of the Interior, under the advice of the préfets.

Superannuation provision for the vérificateurs in 1827.

By an ordinance of 3 November 1827, Charles X. made a provision for granting superannuation allowances to vérificateurs who were no longer able to discharge their duties.

Insufficient establishment of Metric system, and verification and inspection up to 1837.

In the meantime, it was found that the permission granted by the Imperial Decree of 12 February 1812, for the concurrent use of the weights and measures of both the old system and the new Metric system, gave rise to so many complaints of fraudulent practices by retail dealers; and on the other hand, that the system of inspection was so unsatisfactory in its results from the want of authority in the vérificateurs, that the French Government, in 1837, resolved upon making more stringent provisions by law, in order that the Metric system should be uniformly established, and the verification and inspection of the legal weights and measures made more effectual.

More strict law of 4 July 1837, now in force.

The provisions of the law of 4 July 1837,* which still regulate the existing Metric system of weights and measures in France, are to the following effect:—

1. The Imperial Decree of 12 February 1812, relating to weights and measures, was abrogated.

* See text of this law, *ante*, p. 21.

2. The use of weights and measures permitted under that decree was allowed to be continued up to 1 January 1840.

3. From 1 January 1840, all weights and measures other than those of the Metric system under the laws of 7 April 1795 (18 Germinal, An III.) and 9 December 1799 (19 Frimaire, An VIII.), are prohibited under the penalties imposed by Article 479 of the Penal Code.

4. All persons who may have other than the legal Metric weights and measures in their warehouses, shops, workshops, or places of business, or in halls, fairs, or markets, are to be punished the same as those who use them, under Article 479 of the Penal Code.

5. From the same date, all denominations of weights and measures other than those specified in the annexed table, and established by the law of 7 April 1795, are prohibited in public Acts, as well as in placards and notices; they are also prohibited in deeds under private seal, trade books of account, and other private written documents produced in courts of justice.

All public officers acting contrary to this provision are made liable to a fine of 20 francs, recoverable in a summary way. The fine for other offenders is fixed at 10 francs; it is leviable for each deed, or signature under private seal; as for trade books of account, a single fine only is payable for each cause in which they were produced.

6. Judges and arbitrators are forbidden to give judgment or decisions in favour of individuals on the evidence of deeds, books of account, or written documents in which the prohibited weights and measures shall be mentioned, before the fines incurred under the preceding articles shall have been paid.

7. Vérificateurs of weights and measures are to inform against breakers of the laws and regulations of the Metric system; they should at once seize all weights and measures prohibited by these laws and regulations. Their evidence is to be held valid in courts of justice, in default of proof to the contrary. They are to make oath before the tribunal of the arrondissement.

Table of legal Metric weights and measures.

8. A Royal Ordinance is to regulate the mode of verification of weights and measures.

The following table of legal weights and measures, taken from the law of April 1795, was annexed to this law of 4 July 1837.

Table of Metric Weights and Measures.

Measures of Length.

Myriamètre	=	10,000 mètres.
Kilomètre	=	1,000 „
Hectomètre	=	100 „
Mètre	=	Fundamental unit of weights and measures (10,000,000th part of the meridian quadrant).
Décimètre	=	10th of the mètre.
Centimètre	=	100th „
Millimètre	=	1000th „

Measures of Land.

Hectare	=	100 ares, or 10,000 square mètres.
Are	=	A square 10 mètres each side, or 100 square mètres.
Centare	=	100th of the are, or a square mètre.

Measures of Capacity for Liquids and Dry Goods.

Kilolitre	=	1,000 litres.
Hectolitre	=	100 „
Décalitre	=	10 „
Litre	=	A cubic décimetre.
Décalitre	=	10th of the litre.

Measures of Solidity.

Décastère	=	10 stères.
Stere	=	cubic mètre.
Décistère	=	10th of the stère.

Weights.

		1,000 kilogrammes, the weight of a cubic foot of water, and the ton used for ships.
		100 kilogrammes, the metric quintal.
Kilogramme	=	1,000 grammes, (weight in a vacuum of a cubic décimètre of distilled water, at the temperature of 4° Centigrade).
Hectogramme	=	100 grammes.
Décagramme	=	10 „
Gramme	=	Weight of a cubic centimètre of water at 4° Centigrade.
Décigramme	=	10th of the gramme.
Centigramme	=	100th „
Milligramme	=	1000th „

Coins.

Franc	=	5 grammes of silver of the standard of $\frac{9}{10}$ fine silver.
Décime	=	10th of the franc.
Centime	=	100th „

In conformity with the provisions of the law of 7 April 1795, each weight and measure of capacity in this decimal scale is to have also its double and its half.*

Royal Ordonnance of 17 April 1839, for Verification of Metric Weights and Measures.

Royal ordonnance 17 April 1839, for verification of Metric weights and measures.

The Royal Ordonnance establishing the general regulations relating to the verification of French Metric weights and measures, in pursuance of Article 8 of the preceding law, and emanating from the Council of State, bears the signature of King Louis Philippe, and the counter-signature of the Minister of Commerce. It is dated 17 April 1839, and is to the following effect:—

Section I.—Vérificateurs.

8. Vérificateurs.

Art. 1.—The verification of commercial weights and measures is to be carried out under the supervision of the préfets and sous-préfets, by officers appointed and dismissable by the Minister of Commerce,† &c.

2. A vérificateur is to be appointed for every communal arrondissement. This office is to be established, if possible, at its chief town.

Should, however, the public service require that several offices should be established in an arrondissement, the préfet may make the necessary recommendation to the Minister of Commerce, &c., who, if he think fit, may order accordingly.

Assistant vérificateurs may also be appointed by the Minister, subject to the same conditions, and having the same functions, as the vérificateurs.

3. No one shall be employed as vérificateur under the age of 25, and who shall not have passed such special examinations as the Minister of Commerce, &c. shall direct.

4. The office of vérificateur cannot be held by any person holding any other public employment, or engaged in any business subject to verification.

5. Vérificateurs cannot enter upon their duties until they shall have taken the oath prescribed by the law of 31 August 1830, before the proper tribunal (*Tribunal de première instance*) of the arrondissement to which they are appointed. In case of change of residence, or of temporary absence on duty, they are bound only to have their instrument of appointment and the certificate of register of their oath viséed at the registry of the place to which they remove or are sent.

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* The law of 4 July 1837, authorizes the double and the half of each *weight and measure of capacity* only in this decimal scale. But the Royal Ordonnance of 16 June 1839, issued in pursuance of the law authorizes also the double and half of the mètre and dekamètre, and the double of the dekamètre.

† The appointment of vérificateurs was subsequently left to the préfets.—See Decree of 25 March 1852.

6. Every office of verification shall be furnished with the necessary supply of verified local standards and stamps from the depôt of primary standards at the office of the Minister of Commerce, &c. These local standards should be reverified at the chief office once in 10 years.

The stamps for verification in the departments shall be constructed under the orders of the Minister of Commerce, &c., and shall bear a distinguishing mark for each year they are used.

The stamps for verifying weights and measures, when new or readjusted, shall be distinct from those used merely as the evidence of periodical verification.

7. The local standards and the stamps of the offices of verification are to remain in the custody of the vérificateurs, who are to be responsible for them, under the supervision of the préfets and sous-préfets.

8. The remuneration of the vérificateurs is to be authorized by the Minister of Commerce, &c. It comprises an allowance for ordinary travelling expenses, office expenses, keeping in order and transport of apparatus for verification, and charges for stereotyped printed forms.

The standards are to be kept and the several operations executed in the localities directed by the Government.

The standards, stamps, registers of verification, and furniture of the offices, are to be supplied by the Government to the vérificateurs.

Their extraordinary travelling expenses out of the arrondissement are to be reimbursed to them.

9. Vérificateurs may be superseded by the Préfets. Immediate notice of the suspension must be given to the Minister of Commerce, &c.

Section II.—Verification.

10. Weights and measures newly made or readjusted must be brought to the office of the vérificateur to be verified and stamped before being issued for trade use.

11. No weight or measure can be submitted for verification sold, or used for trade purposes, if it does not bear distinctly and legibly marked upon it the name assigned to it in the Metric system.

The Minister of Commerce, &c. may except from this regulation any weights or measures to which from their dimensions it may be inapplicable.

12. The form of weights and measures for trade purposes shall be determined by Government regulations, as well as the material of which these weights and measures shall be constructed.

13. Independently of the original verification directed by Art. 10, weights and measures used by, or in the possession of, traders specified in Art. 15, are subject to a periodical reverification to ascertain if they still agree with the standards.

A new stamp will be impressed each time as evidence of this periodical reverification.

14. Manufacturers and dealers in weights and measures are not subject to this periodical reverification, except as regards those weights and measures which they use in their business.

Weights, measures, and weighing machines, either new or readjusted, which are intended to be sold, should be marked only with the stamp of original verification.

15. The Préfets are to prepare for each department tables of trades to be subjected to periodical reverification. These tables will specify the assortment of weights and measures with which the several traders are to be provided.

16. Any such trader who engages in several different trades should be provided with the assortment of weights and measures for each of them, unless those required for one trade shall be included in any other in which he is engaged.

17. Any such trader who publicly opens in the same locality several distinct warehouses, shops, workshops, or places of business in different houses, and not contiguous, should provide for each an assortment of the weights and measures specified for his trade.

18. The periodical reverification is to take place once a year in the chief towns of the arrondissement, and in the communes specified by the préfets, and once in two years in all other places. In 1840, however, it shall take place in all the communes without distinction.

The préfet regulates the order in which the verification shall take place in the several communes.

19. The vérificateur is bound to complete the round of visitation assigned to him for each year, and to attend at the place of business of every person subject to verification, as specified in the list to be prepared in pursuance of Art. 50.

He is to verify and stamp the weights, measures, and other instruments exhibited to him, not only the minimum number which the trader is compelled to provide himself with, but any more which he may have. And he is to note down everything in a portable register, which he will place before the trader to be vouched by him, and if the trader cannot or will not sign it, he will inform against him.

20. The periodical reverification is to take place at the town hall in such localities as the Minister of Commerce, &c., for the convenience of trade, and on the advice of the préfets, shall judge will most facilitate the process; but this provision shall not be in all cases obligatory on those persons who are subject to verification, nor does it apply to persons entitled to verification at their own premises.

Vérificateurs are empowered, either officially or on the requisition of mayors and of the law officers of the Crown (*Procureur du Roi*), or by order of the préfets and sous-préfets, to visit at unexpected times the premises of persons subject to verification.

21. Itinerant dealers who use weights and measures are bound to exhibit them within the first three months of every year, or of the period when they exercise their trade, at one of offices of verification in the district where they hawk about their goods.

22. Balances, steelyards, and other weighing machines, are to be submitted for original verification and stamping before being exposed for sale or issued to the public.

They are also subject to inspection when used, and to periodical reverification on the premises.

23. Wooden measuring frames for the stère and double stère, employed by dealers in firewood, are, before being used, to be verified and stamped in the yards where they are required. They are also subject to periodical verification.

24. Weights and measures of the Octroi offices, public weighing offices, those used for weigh-bridges, hospitals, prisons, benevolent institutions, and all other public establishments, are subject to periodical verification. *See* Circular, 15 May 1841.

25. Weights and measures used in market halls, fairs and markets, moveable stalls, and by foreign and itinerant dealers, are subject to the exercise of this function of the vérificateurs.

26. The visits and inspections which the vérificateurs are empowered to make on the premises of persons whose weights and measures are subject to verification, can be made only during the day. They may, however, be made at any time during which places of business are open to the public.

27. The préfets by public notices determine for each commune the period when the verification for each year commences, and when it terminates.

At the expiration of the last day of the period so notified, and after the verification in the commune is at an end, traders, employers, and workpeople are prohibited from using or retaining in possession weights, measures, and weighing machines, which shall not have been submitted to periodical verification, and have been impressed with the year's stamp.

Section III. — Inspection of Dealings in Goods sold by Weight or Measure.

S. 3. Inspection of dealings in goods sold by weight or measure.

28. Inspection of dealings in goods sold by weight or measure is specially entrusted to the vigilance and authority of préfets, sous-préfets, mayors, and officers of police.

29. Mayors and officers of police are to visit several times in the year shops, warehouses, public places, fairs, and markets, in order that they may satisfy themselves of the accuracy and just use of weights and measures.

They are to inspect the public weighing and measuring offices belonging to the municipal authorities.

They are to satisfy themselves that the weights and measures bear the marks and stamps of verification, and that since they were verified, as proved by these marks, they have undergone no alteration, either accidental or fraudulent.

30. They are frequently to inspect steelyards, balances, and all other weighing machines, and to satisfy themselves of their accuracy and free movements, as well as inform against all breaches of the law and regulations.

31. Mayors and officers of police will keep watch against any unjust dealings in goods, which, when cast or moulded, are sold by the piece, or in a packet, as being of a given weight; but the moulds or patterns used for making articles of this kind are not to be considered as weighing instruments or be subject to verification.

See Circular, 10 November 1856.

32. Vessels or casks for holding beverages, liquids, or other materials are not to be considered measures of capacity or of weight.

In retail dealings in beverages and other liquids, no specific and definite measure shall be sold unless it shall have been actually measured.

33. Public notices upon the subject of weights and measures, drawn up by the préfets, with the exception of those authorized by Art. 18, shall not be issued or put in force until approved by the Minister of Commerce, &c.

Section IV.—Offences against the Weights and Measures' Laws and Regulations, and mode of proceeding against Offenders.

S. 4. Offences and mode of proceeding.

34. Independently of the powers conferred upon officers of judicial police by the code of criminal instruction, vérificateurs are to lay informations of offences against the weights and measures laws and regulations within the limits of the arrondissement to which they are appointed and sworn.

See Circular, 24 June 1852.

They are bound to produce their instrument of appointment to those persons subject to verification who may require it.

Their evidence is to be held valid in courts of justice, in default of proof to the contrary, in pursuance of Art. 7 of the law of 4 July 1837.

35. Vérificateurs are to seize all weights and measures other than those authorized by the law of 4 July 1837.

They are also to seize all weights and measures, or weighing and measuring instruments, which have been altered or are defective, or do not bear the legal marks of verification.

36. They are to observe and note down the several details relating either to the possession or use of prohibited weights or measures.

37. If they find measures to be in a state of oxydation which may be hurtful to the health of the public, they are to give information to the mayors and to the police.

38. Persons whose weights and measures are subject to verification are bound to keep their shops, warehouses, or workshops open, and not to leave their place of business on the day appointed for verification, after it shall have been publicly notified at least two days previously by the mayor in the ordinary form.

They are also bound to afford every facility for the periodical verification provided for by Articles 19 and 20.

39. In case the vérificateurs are refused admittance, or if at any time they present themselves at places of business before sunrise and after sunset to exercise their functions in pursuance of Art. 26, they can only claim entrance to the shops, buildings, or warehouses when accompanied by a magistrate or his representative, either the mayor, his assistant, or an officer of police.

40. The several public officers referred to in the preceding Article are not to refuse immediately to accompany the vérificateurs when so required by them, and if any information be drawn up it shall be signed by the public officer in whose presence the facts occur; in case of refusal of admittance, the vérificateurs are authorized to state it in their information.

41. Vérificateurs are to draw up their informations within twenty-four hours after they have witnessed the offence committed. They shall themselves write out these informations, sign them, and verify them on oath the day after they are drawn up, before the mayor, or his deputy, either of the commune where they reside, or of that where the offence has been committed. The declaration on oath is to be signed by the mayor and his deputy as well as by the vérificateurs.

42. These informations are to be registered within fifteen days after they are sworn to, and in pursuance of Art 74 of the law of 25 March 1817, they are marked as debited for the stamp, to be subsequently recovered as costs from the offender on conviction.

43. Within the same period the informations are to be laid before the magistrate, who proceeds with them in accordance with the regulations established by Articles 20, 21, and 139 of the Code of Criminal Instruction.

44. Vérificateurs of weights and measures are under the supervision of the law officers of the Crown, without prejudice to their subordination to their superior officers of the Government.

45. If in any placards or public notices mention is made of any denomination of weights and measures other than those stated in the table annexed to the law of 4 July 1837, municipal and police officers are bound to take notice of the breach of the law, and immediately to lay their informations at the Registry Office.

Vérificateurs and all other duly authorized public officers are also bound to give information at the Registry Office of all offences of this description that come under their cognizance.

Communal registrars shall, either on their own official authority or upon these informations, or upon sworn informations, take the necessary steps to recover from the offenders the fines prescribed by Art. 5 of the before-mentioned law.

Section V.—Fees payable on Verification.

S. 5. Fees on Verificati

46. No fee is chargeable on the original verification of weights and measures and weighing machines.

Nor on weights, measures, and weighing machines after adjustment and submitted for reverification.

See Circul 10 April 1858, p. 10

47. Fees on periodical verification are to be levied provisionally, according to the tariff annexed to the Royal Ordonnance of 18 Dec. 1825, modified by those of 21 Dec. 1832, and 18 May 1838.

48. No fee is chargeable on weights, measures, or instruments for weighing, belonging to public establishments specified in Art. 24.

Nor on weights, measures, or instruments for weighing presented voluntarily by individuals, not being subject to periodical verification.

49. Fees on periodical verification are payable on the assortment of weights and measures required to be kept by persons subject to such verification and for their weighing instruments.

No fee is payable on the verification and stamping of any weights and measures exceeding the number which they are required to keep.

See Circul 10 April 1858.

50. Schedules of the fees payable in respect of the duties performed by the vérificateurs, and made up to 1st August in each year, are to be prepared by them and transmitted to the Directors of Direct Taxes.

51. The Directors of Direct Taxes, when they have examined and verified these schedules, are to prepare the corresponding charge lists to be sent to the préfet, and immediately put in course of collection by the same means and with the same drawbacks and allowances for overcharge as in the case of the direct taxes.

52. Before the end of each year supplementary schedules are to be prepared for any verifications made under special circumstances at a later date than that specfied in Art. 50.

53. The collection of fees of verification is to be made by Treasury officers. The total amount of each charge list is payable within fifteen days from their issue. Art. 3 of the Royal Ordonnance of 21 Dec. 1832 (directing that the schedule of fees be not prepared until the work to which it refers is completed), will remain in force.

54. The allowances to Treasury officers for collecting these charges, as well as the repayments to the Directors of Direct Taxes for the expenses of preparing the charge lists, are to be regulated by the Minister of Finance.

Section VI.—General Provisions.

55. Any breach of the orders of the préfets or of the mayors and of this Royal Ordonnance is to be prosecuted according to the laws.

56. Various previous Decrees recited and repealed, including the Consular Decree of 4 Dec. 1825, and the Royal Ordonnances of 18 Dec. 1825 7 June 1826, 21 Dec. 1832, and 18 May 1838, save such of their provisions as are kept in force under Articles 47 and 53; all the Government regulations under the Decree of 12 Feb. 1812 cease to take effect from 1 Jan. 1840.

57. The Ministers of Commerce and of Finance are charged with the execution of this Royal Ordonnance.

Royal Ordonnance of 16 June 1839, relating to the Form and Material of Weights and Measures in common use.

The general regulations for the form of the French Metric weights and measures and the material of which they are to be constructed, are contained in the Royal Ordonnance of 16 June 1839, which recites the law of 4 July 1837, and Article 12 of the Royal Ordonnance of 17 April 1839, upon which it is founded. This Royal Ordonnance bears the signature of King Louis Philippe and the counter-signature of the Minister of Commerce, and is to the following effect:—

Art. 1.—From 1 January 1840, no weights and measures and instruments for weighing and measuring shall be constructed for original verification except they agree with the conditions specified under the several heads appended to this Royal Ordonnance. (*See* § 1 to § 6.)

Art. 2.—Weights, measures, and weighing machines bearing the stamp of original verification, and which in other respects accord with the established regulations, shall be admitted for periodical verification as follows:—

Decimal measures of length, when the divisions and denominations of the old system shall have been effaced.

Decimal dry measures of capacity, whatever may be the description of wood of which they are made.

Decimal pewter measures, of whatever weight they may be.

Decimal weights of iron and of brass, whatever may be their form, after the mark of their denominations under the old system has been effaced, and provided that they bear the proper Metric denomition marked on their upper surface.

Decimal weights in iron and brass, bearing their denominations only marked in myriagrams, kilograms, hectograms, or dékagrams.

Decimal weights to be used with large weighing machines, provided that they bear no other mark than that of their real weight.

Steelyards, with the divisions and denominations of the old system effaced, provided that they are graduated in decimal divisions and they vibrate correctly.

Such decimal weights and measures are not allowed to be kept by persons subject to verification, unless they have been subjected to the modifications specified before 1 Jan. 1840; they may be readjusted but not made up anew.

Art. 3.—All weights and measures other than those provisionally allowed under Art. 2 shall be unserviceable after 1st January 1840.

Art. 4.—Models and designs of the weights and measures which are legally authorized shall be deposited in all the offices of verification, and be open to all persons who may wish to become acquainted with them. *See* Circular, 15th September 1839.

Art. 5.—The Minister of Commerce, &c. is charged with the execution of this Royal Ordonnance, which is to be published in the *Bulletin des Lois.*

Appendices to the Royal Ordonnance of 16 June 1839.

§ 1.—Measures of Length.

§ 1. Measures of length.

Names of Measures.
Double dékametre.
Dékametre.
Demi-dékametre.
Double mètre.
Mètre.
Demi-mètre.
Double décimetre.
Décimetre.

These measures of length should be constructed of metal, wood, or other solid substance.

They may be made in the form most suitable to the uses for which they are intended.

Besides measures in one piece, they may be made of several pieces, provided that the number be two, five, or ten.

The measures must be solidly made.

Metal ends should be fixed to wooden measures of the metre, double metre, and half metre.

The subdivision of centimetres or millimetres should be accurate, clean cut, and at right angles to the length of the measure.

The proper denomination of each measure is to be engraved on the upper surface of each measure, which should also bear the name or mark of the maker.

The dékametre, its double and half, when in the form of a chain, should have the links of sufficient strength, and of the length of two or five décimetres; the rings at each mètre should be made of metal of a different colour from that used for the other rings.

§ 2. Dry measures of capacity.

Names of Dry Measures.
Double hectolitre.*
Hectolitre.
Demi-hectolitre.
Double dékalitre.
Dékalitre.
Demi-dékalitre.
Double litre.
Litre.
Demi-litre.
Double décilitre.
Décilitre.
Demi-décilitre.

Dry measures of capacity must be made of cylindrical form, their internal diameter equal to the height.

* Authorized 2 May 1840.

Wooden measures can be made only of oak,* with all their parts firmly put together.

If any part of the handle or other addition projects inside the measure, the height must be increased in proportion to the volume of the projection.

See Circulars, 19 December 1859 and 5 June 1860.

Wooden measures must be made of a thin slice or sheet of wood bent round and fastened with nails.

All wooden measures must have their upper edge protected with a thin plate of iron fixed on it.

See Circulars, 8 November 1857 and 2 April 1860.

These measures, from and including the double dékalitre, up to the héctolitre, should also be strengthened with iron ; and according to the use for which they are intended they may have legs attached with bolts and nuts.

Wooden measures of the smallest size may be furnished with iron hoops.

Dry measures may be made either of brass or sheet iron, provided that they are of sufficient strength and in the form prescribed above.

Every measure must be marked with its proper denomination ; the name or mark of the maker must be upon the bottom of the measure.

§ 3.—Liquid Measures of Capacity.

§ 3. Liquid measures of capacity.

The names and form prescribed for dry measures of capacity in § 2 will serve to regulate the construction of similar measures used for liquids, from the hectolitre down to the demi-dékalitre inclusive. They may be made of brass, or sheet or cast iron, but on the express condition of preventing, by tinning or some other analogous process, any oxydation or alteration of surface, which may have an injurious effect in the use of these kinds of measures.

Measures of the double litre and under should be made only of pewter, and their internal height must be double the diameter. The minimum weight of each of these measures must be as follows :—

Names of Liquid Measures.	Minimum Weight.		
	Without Handles or Covers.	With Handles and without Covers.	With Handles and Covers.
	Gram.	Gram.	Gram.
Double litre -	1,350	1,700	2,200
Litre - -	900	1,100	1,350
Demi-litre -	525	650	820
Double decilitre -	280	335	420
Decilitre - -	145	180	240
Demi-decilitre -	85	110	140
Double centilitre -	45	60	85
Centilitre - -	23	35	50

The standard for the pewter used for constructing measures is fixed at 83½ per cent. of pure tin, with an allowance of error of 1½ per cent. Thus the pewter must not contain less than 82 per cent. of pure tin, nor more than 18 per cent. of alloy.†

The measures, both as to the interior and to the upper edge, should be left unaltered, as cast from the mould, and be without flaw or other imperfection.

See Circular, 4 June 1854.

The name of each measure is to be inscribed upon its body ; the name or mark of the maker to be affixed at the bottom.

See Circular, 5 November 1852.

Liquid measures, from the double litre to the décilitre, may be constructed of tin plate ; but such measures intended for milk only should be of a cylindrical form, with the height equal to the diameter, as prescribed for dry measures in § 2. They are to have a handle, or a hook, also of tin plate, and are to bear their name upon the upper edge, which is turned over. Care must be taken to fix two bits of flat pewter, for receiving the stamps of verification, one at the upper edge and the other at the lower edge where it joins the bottom, which should also bear the name or mark of the maker.

See Circular 30 August 1839.

See Circular 5 August 1854.

§ 4.—Iron Weights.

§ 4. Iron weights.

Weights should be made of cast iron. Their names and the abbreviated denominations to be inscribed upon each, in legible characters, are shown in the following table :—

Names of Iron Weights.	Abbreviated Denomination to be inscribed on the upper Surface.
50 kilograms - - -	50 kilog.
20 kilograms - - -	20 kilog.
10 kilograms - - -	10 kilog.
5 kilograms - - -	5 kilog.
Double kilogram - -	2 kilog.
Kilogram - - -	1 kilog.
Demi-kilogram - - -	½ kilog.
Double hectogram - -	2 hectog.
Hectogram - - -	1 hectog.
Demi-hectogram - -	½ hectog.

Iron weights of 50 and 20 kilograms are to be made in the form of a truncated pyramid, rounded at the angles, and having a parallelogram for the base.

Other iron weights, from 10 kilograms to a ½ hectogram inclusive, are to be made in the form of a truncated pyramid, with a regular hexagon for the base.

The rings with which these weights are furnished are to be placed so as not to pass beyond the edge of the weights.

Every ring should be of wrought iron, rounded and welded.

Every ring attached by a staple should move easily in the groove made upon the weight to receive it.

Every staple should be of wrought iron, strongly made, both at the top which holds the ring, and quite up to the ends, which ought to be bent round with a hammer underneath, in order to retain the lead required for adjustment.

Iron weights should not show on their surface either the marks of the mould or flaws, and the cast metal should not be rough (*aigre*) or brittle.

Every weight should be provided at the ends of the staple with a sufficient quantity of lead, poured at one melting, and intended to receive the impressions of the stamps of verification, both original and periodical, as well as the mark of the maker, which is to be placed there.

§ 5.—Brass Weights.

§ 5. Brass weights.

Brass weights are specified in the following table, which shows also the denomination which is to be inscribed on the upper surface of each of them.

Names of Brass Weights.	Denomination to be inscribed upon each.
20 kilograms - - -	20 kilogrammes.
10 „ - - -	10 kilogrammes.
5 „ - - -	5 kilogrammes.
Double kilogram - -	2 kilogrammes.
Kilogram - - -	1 kilogramme.
Demi-kilogram - - -	500 grammes.
Double hectogram - -	200 grammes.

Barny, p. 184.

* See Circular, 5 Nov. 1852, and 3 Oct. 1856, authorizing also walnut, beech, and chesnut.

† This proportion is the same as that originally fixed by the Directory, in pursuance of the law of 28 Germinal, An. III. Lead is most generally used as the alloy for pewter, and always for the mixed metal of which measures are made. Tin is not sufficiently malleable to be worked in a pure state, but is rendered so by a mixture of from 3 to 4 per cent. of lead. In 1799, some eminent French chemists were consulted by the Government as to the most suitable proportions in a sanitary point of view of the metal for these liquid measures, which were continually to be used for beverages, and their decision was adopted by the legislature. The specific gravity of pewter, consisting of 82 parts tin and 18 lead, is 7·765. It has, however, since been found that certain liquids have a corrosive action upon this metal, not only injurious to health but fatal. Similar injurious effects appear to result from pewter of the same specific gravity made with alloys of zinc, arsenic, antimony, &c. ; and it is stated that practically the verificateurs are unable to discover from their specific gravity the exact composition of the metal of which these liquid measures are made.

Names of Brass Weights.	Denomination to be inscribed upon each.
Hectogram - - -	100 grammes.
Demi-hectogram - -	50 grammes.
Double dékagram - -	20 gram.
Dékagram - - -	10 gram.
Demi-dékagram - - -	5 gram.
Double gram - - -	2 gram.
Gram - - -	1 gram.
Demi-gram - - -	5 décig.
Double décigram - -	2 décig.
Décigram - - -	1 décig.
Demi-décigram - - -	5 centig.
Double centigram - -	2 C. C.
Centigram - - -	1 C. C.
Demi-centigram - -	5 M. C.
Double milligram - -	2 M.
Milligram - - -	1 M.

The form of brass weights, from 20 kilog. to 1 gram. inclusive, is to be cylindrical, and with a knob; the height of the cylinder equal to the diameter, for all the weights down to and including 5 gram.; the height of the knob to be equal to half the diameter of the cylinder upon which it is placed. These last provisions are not to apply to weights of 1 and 2 gram., which are to have the diameter greater than the height.

Weights from and including 5 décig. to the millig. are to be made of thin sheet brass, cut square.

Cylindrical brass weights, with a knob, should either be solid or containing a certain quantity of lead inside; but they should all be of the same volume. They may be made in one piece, or of two pieces only, the cylinder and the knob. In this latter case, the knob is to be attached by a screw to the upper surface of the cylindrical body of the weight, and permanently fixed by a pin or small screw levelled with the surface. This should be of copper, in order that it may be easily distinguished.

A set of brass weights may also be made from a kilogram or one of its parts, in the form of conical cups fitting into each other, and thus enclosed in a box which is itself a legal weight.

The surface of brass weights should be clean and bright, to enable any foreign substance to be seen that may have been driven into the metal, or any flaw which may allow its introduction.

The denominations are to be engraved in legible characters, on the upper surface of the weights, and each weight to bear the name or mark of the maker.

§ 6.—Weighing Instruments.

The legal instruments for weighing are—

1. Balances with equal arms.
2. Large weighing machines (*balances-bascules*).
3. Roman balances, or steelyards (*romaines*).

Balances with equal arms, used in shops and warehouses, should be made of sufficient stability. The beams should be deep rather than wide, particularly at the centre, where the knife edges of pivots cross them at right angles, the edges forming a straight line. The extreme points of suspension should be placed at exactly an equal distance from these knife edges. The beam should not shift at its centre, but the balance should oscillate freely on the knife edges or pivots, its sensibility being fixed at $\frac{1}{2000}$th part of the weight which it carries.

Large weighing machines (*balances-bascules*) should oscillate and be constructed so as to show the exact proportion of 1 to 10 of whatever weight may be placed upon the platform. As these weighing machines must be constructed so as not to carry a less maximum weight than 100 kilograms, they must be very strongly made. No weights must be used with them, except such as are prescribed in § 4. The maximum weight which each machine will carry is to be marked in kilograms upon a brass plate inlaid in its wooden frame. The sensibility of weighing machines of this kind is fixed at $\frac{1}{1000}$th part of the weight carried. *See* Circular, 30 July 1857.

Steelyards should be solidly made. The knife edges upon which they are balanced should be fine enough to enable the beam to move freely; the lever also should be so strong that they do not bend with the sliding weight moved along them. The pivot passing through the upper part of the lever should not have too much friction in the fork.

These lever balances should oscillate. Every other kind is prohibited.

The sensibility of these lever balances is fixed at $\frac{1}{500}$th part of the weight they carry.

Steelyards are to be marked only with the decimal divisions of the metric weights established by law. Every other division is prohibited. The greatest weight they will carry is to be marked in kilograms upon the side on which the divisions are marked.

Every weighing machine must bear the name or mark of the maker.*

§ 7.—Measuring Instruments.

§ 7. Measuring instruments.

Frames representing solid measures of the *demi-décastère*, the *double stère*, and *stère*, and intended for measuring firewood, are to be constructed of sound wood; the several pieces are to be properly trimmed and firmly put together.

Every frame must consist of a base or sole, two uprights, and two ties; it should also have two cross pieces at the base.

The length of the base between the uprights is fixed as follows:—

The demi-décastere -	3 metres.
Double stère - -	2 „
Stère - - -	1 „

For wood cut to the length of a mètre, the height of the upright pieces is to be—

The demi-décastère -	1·677 mètre.
Deuble stère and stère -	1 „

The weight will vary according to the length of the wood, so as to bring out a solid measure of 1, 2, or 5 cubic mètres.

Frames of the double stère and stère may also be made of iron, provided that they fulfil the required conditions of accuracy and solidity, and that they are furnished with escutcheons attached to them, either of brass or lead, to facilitate their being marked with the stamps of verification.

Ministerial Instructions for carrying out the Metric Law and Royal Ordonnances.

Ministerial instructions for carrying out the Metric Law and Royal Ordonnances.

The Ministerial Instructions for more directly carrying out the two Royal Ordonnances of 17 April 1839, and 16 June 1839, founded upon the Law of 4 July 1837, are contained in two official circulars, the first dated 30 August 1839, relating to the service of verification, the second, dated 15 Sept. 1839, relating to the form and material of weights and measures, and the mode of verification.

Official Circular Instructions relating to the Service of Verification of Weights and Measures in France.

Circular 30, August 1839, relating to the service of verification, &c.

The ministerial circular containing the general code of instructions for the service of verification of weights and measures in France, and addressed to the préfets

* M. Barny (p. 210) states that weighing machines and steelyards were first required to be verified by Art. 24 of the Royal Ordonnance of 18 Dec. 1825, but were not subjected to periodical reverification previously to 1 Jan. 1834, under Art. 8, of the Royal Ordonnance of 21 Dec. 1832. In transmitting this ordinance to the préfets, and the consequent instructions for carrying into effect, dated 14 Oct. 1833, the Minister of the Interior stated that it would be requisite that the vérificateur should be provided with proper weights for the purpose; that these weights did not form part of his kit (*nécessaire du vérificateur*); that they could not be furnished for him, nor could he be charged with the cost of their transport; it was then *indispensable* that the communes where they were required should find them for him, the expense not being great; that for verifying balances, two weights are sufficient; for steelyards throughout their whole length, and for weighing machines of the several sizes, a larger number would be required, and these should be promptly provided.

He adds that these regulations still remain in force. But that, practically, there is no small town or even village, where there are not weighing machines and steelyards in use that the vérificateur is unable duly to verify for want of the requisite standard weights.

of each department, bears date 30 August 1839, and has affixed to it the signature of the Minister of Commerce, &c.

It recites the two Royal Ordonnances of 17 April and 16 June 1839, founded on Art. 8 of the law of 4 July 1837; the first, regulating the general service of verification; the second, the form and material of the legal weights and measures; and that under the latter head a separate code of detailed instructions will be drawn up. It recites also the several steps already taken by the Departement du Commerce, &c., for carrying out the provisions of the law of 1837, viz., making the original verification of weights and measures gratuitously; publishing the law in all the communes of France; a considerable increase in the pay of the vérificateurs; establishing the offices of verification, and providing for the charges of rent upon a new system, to the advantage of the vérificateurs and without prejudice to the public service; thus sufficiently testifying by these amongst other provisions the importance attached by the Government to the due carrying out of the law of 1837, and the Royal Ordonnances founded upon it.

The circular then proceeds to give the following special instructions for the more effectual carrying out of the six sections of the Royal Ordonnances of 17 April 1839.

§ I.—Verificateurs. (Art. 1–9.)

§ 1. Vérificateurs.

Art. 1.—The officers of verification are to be classed as follows :—

Vérificateurs.
Deputy Vérificateurs (*adjoints*).
Assistant Vérificateurs (*aides*).
Office boys (*garçons de bureau*).
Workmen (*hommes de peine.*)

Art. 2.—Directs that a vérificateur be appointed for each communal arrondissement (such an officer being in fact already appointed), and provides that a deputy vérificateur may also be appointed, subject to the same conditions and having the same functions as the vérificateurs. This Article should be taken together with Article 5, which requires that the vérificateurs should not enter upon their duties until they have taken the necessary oath, and with Article 34, obliging them to exhibit their instrument of appointment to all those persons subjected to periodical verification, who may demand to see it. Their effect is that the vérificateurs and the deputies should alone take the oath, and that it is necessary, in order to place these officers in their proper legal position, that they should be confirmed by the Minister of Commerce, &c., in the offices which they now hold, or should be replaced by others, if considered incapable of duly fulfilling the requisite duties.

Mod appo men

For this purpose, the préfet is requested to fill up, date, and sign, and to transmit to the Minister of Commerce, &c., the following tabular form (A.), separately for each officer of verification to be appointed to the department :—

Form tifica appo men

A.—*Service of Weights and Measures.*

Designation of Office of Verification.	Name of Officer.	Office.	Date of Birth.	Date of entering the service of verification.	Suggestion of the Préfet for continuing or replacing the Officer.	His reasons for this suggestion.	Declaration that the Officer holds no other public office or business subject to verification.	Remarks.

This form is intended both to contain and to justify the propositions to be made by the préfets for filling up the several offices of verification of weights and measures in each department. It has already been intimated that there is no wish on the part of the Government to interfere with any existing officer; but the welfare of the public ought to be the first consideration, and should serve as a guide in all such recommendations.

As to existing officers.

Acting on the principle that the laws and ordinances have only a prospective effect, any vérificateurs or deputies who may be considered fit to be continued in their offices will not be called upon to comply with the new conditions of appointment imposed by the ordinance; but if there are any vacancies to be filled up, all candidates who may offer must, as a preliminary condition, comply with the regulations to be prescribed in pursuance of Art. 3, as will be presently shown.

Age and qualification of vérificateurs.

According to Art. 3 and the latter part of Art. 2, no person can act as vérificateur or deputy vérificateur under the full age of 25 years, and if he has not passed the prescribed examination. This provision with regard to his age is to be carried out by an inspection of the certificate of his birth, the production of which in due form becomes henceforth indispensable; and although, on the other hand, the ordinance specifies no maximum age beyond which a candidate is inadmissible, yet it should be borne in mind that the functions of a vérificateur, to be exercised throughout a considerable district, demand strength and activity incompatible with an advanced period of life.

With regard to the special qualifications which the new vérificateurs and deputies should possess, and the examination which they should undergo, the following regulations have been drawn up, in pursuance of the powers conferred by Art. 3 of the Royal Ordonnance. No further directions appear to be required than are contained therein; their execution should be certified by a procès-verbal as shown in form (B).

Regulations for the Examination of Candidates for the offices of Vérificateur or Deputy Vérificateur of Weights and Measures.

Regu for c natio cand

1. When a vacancy occurs, the préfet is to report it to the Minister of Commerce, &c., who will authorize him, if he thinks fit, to issue the requisite notice of an examination of candidates.

2. This notice will recite the preliminary conditions herein-after mentioned which the candidates will have to fulfil, and will fix the day of examination, to be at least 15 days after the issue of the notice, which is to be published and affixed to the door of each office of verification, and elsewhere as may be necessary.

3. The candidates are to inscribe their names at the préfecture of police, or at the office of the department where the examination is held, as the case may be, depositing at the same time a certificate of birth in due form, to prove that they are of the full age of 25 years, conformably with Article 3 of the ordinance of 17 April 1839.

4. A commission will then be formed, composed of a superior officer of the préfecture, and three others named by the préfet, selected as far as possible from the old pupils of the École Polytechnique, professors of arts and sciences, schools, colleges, &c., in full practice.

5. Two examiners, in addition to the superior officer of the préfecture, must be present at each examination.

6. The examination is to take place at the chief town of the department, and to be public.

7. On the day fixed, the candidates are to appear before the examiners in the order of their inscription at the préfecture, and to be examined upon the following subjects :—

Oral Examination.

1. Arithmetic, including the four first rules, fractions, rule of three, and decimals, with their use in all arithmetical operations ;

2. Geometry, including angles, triangles, proportional lines, and like figures ; the measurement of surfaces bounded by straight or curved lines, and that of solids bounded by plane or cylindrical surfaces ;

3. A knowledge of the laws of statics, so far as they relate to the composition of parallel forces, the centre of gravity, the determination of this centre by the triangle and the pyramid, and the equilibrium in the lever ;

4. The theory of the balance and a knowledge of the principal balances in use in trade ;

5. That portion of physics which has reference to temperature, the thermometer, barometer, and specific gravities ;

6. Some chemical knowledge of the oxydation of metals used for weights and measures ;

7. The laws and regulations in force relating to weights and measures, a knowledge of ancient weights and measures most in use, the practical operations of verification, and the duties of the vérificateurs as detailed in the collection of Government instructions.

8. The oral examination should last not less than three-quarters of an hour, unless the candidate should not have given sufficiently good answers to the three first questions, this being quite enough to cause his rejection. Every candidate, not so rejected, should answer five questions at least, viz. :—

1. In arithmetic.
1. In geometry.
1. In statics.
1. In physics, and chemistry.
1. On the duties of vérificateurs.

Written Compositions.

9. Every candidate should write a legible and correct hand, and write French grammatically.

10. He should write a page at least upon a subject given by the examiners, in order to judge of the neatness of the writing, his orthography, and his style.

11. He should solve in writing a question of calculation, the figures to be neatly set down ; the solution of this question should as far as possible, require some knowledge of geometry, physics, or statics, already referred to.

12. After the oral examination, and the written compositions, the Commission is to deliberate, at the same sitting, upon the merits of each candidate, and to draw up a *procès-verbal* of the examination, according to the form directed by the préfet, except in regard to stating in the *procès-verbal* any remarks to which the special circumstances of the examination may have given rise.

13. The *procès-verbal*, signed by all the examiners present, is to be forwarded to the préfet, and by him transmitted to the Minister of Commerce, &c., together with his special report.

The form of the *procès-verbal* (B) is to be as follows :—

Form of Procès-verbal of examination.

(B).—*Procès-verbal of the Examination of Candidates.*

18 . In pursuance of the notice given by the Préfet of for proceeding to the examination of candidates for the office of (*Vérificateur or Deputy Vérificateur*) of weights and measures in the arrondissement of vacant by (*insert cause of vacancy, either death, dismissal, resignation, or superannuation*).

The Commission appointed by the Préfet, and composed of Messrs. (*insert names and descriptions of the four examiners*) has met at the place stated in the said notice.

There were present

_____

_____

_____

_____

The inscribed candidates having complied with the preliminary formalities required by Art. 3 of the Government regulations of 30 August 1839, were in the following order of the inscription at the Préfecture :

_____

_____

_____

The candidates have been questioned, in the order above mentioned, upon the subjects and during the time directed more particularly in Art. 8 of the regulations.*

At the conclusion of the oral examination and the written compositions, the Commission have determined that the candidates have passed the several portions of the examination, as shown in the following table :—

Order of Inscription.	Names of Candidates.	Arithmetic. 1.	Geometry. 2.	Statics. 3.	Physics and Chemistry. 4, 5, and 6.	Service of Verification. 7.	Writing, Orthography, and Style, 9, 10, 11.	Special Remarks.

The Commission is consequently of opinion that Messrs.

_____

_____

_____

are qualified as Candidates for the office of .

And the Members of the Commission have signed this *procès-verbal*, in order that it may be forwarded to the Préfet of , and by him transmitted to the Minister of Commerce, &c. At this day of

_____

_____

_____

Note.—This form is on the supposition that there are several candidates ; it will easily be modified if there is but one. As many copies of this *procès-verbal* should be made as there are candidates, and each copy should be certified by the préfet as being in conformity with the regulations, and should bear the official stamp of the préfecture.

Action of préfets on receipt of circular instructions.

The préfets will consequently, on receipt of the circular, proceed either to continue in employment the officers of verification in their several departments, or replace them by others. If it becomes necessary to fill up any vacancies, they will proceed to state the requisite examinations and transmit the results, together with the several documents to the Minister of Commerce, &c. ; these documents being the examination papers of each candidate which have been satisfactory, the certificate of birth in due form, and the *procès-verbal*. On receipt of these documents, the recommendation of the préfets will be taken into

* If one or more of the candidates should have been rejected, under the terms of Art. 8, mention should here be made of the candidates so rejected.

consideration, and as soon as the appointments are determined upon a special instrument of appointment for each officer of verification of weights and measures in their department will be transmitted to the préfets.

Vérificateur to hold no other public employment, &c.

But attention should be drawn to the provisions of Article 4, which declares the office of vérificateur, and consequently that of deputy vérificateur, incompatible with any other public employment, or with any business subjected to verification. The préfets are particularly recommended to satisfy themselves by every means in their power that these provisions are duly carried into effect. The vérificateurs and deputy vérificateurs should also never forget that, independently of any other public employment, and of any business subjected to verification thus expressly prohibited to them by the Royal Ordonnance, they should also abstain from any occupation which may distract them from their official duties, or place them in any position incompatible with their character of public officers. The préfets are desired to make a special report to the Minister of Commerce, &c. of whatever may appear to contravene these regulations.

Oath of vérificateur.

According to the terms of Article 5, vérificateurs cannot enter upon their functions until they shall have taken, before the chief tribunal of the arrondissement to which they are appointed, the oath prescribed by the law of 31 August 1830.

Consequently, as soon as the vérificateurs and deputy vérificateurs shall have received their instruments of appointment, the préfets will direct the necessary steps to be taken under Article 5, the terms of the oath being as follows :—

"I swear fidelity to the King of the French, obedience to the constitutional charter and the laws of the Kingdom."*

This oath is to be taken in the customary way, and in order to prove that this essential formality has been duly complied with, a certificate to that effect shall be made upon the instrument of appointment of each vérificateur.

Registration dues on taking oath.

The Minister of Commerce will take due care, in concert with the Minister of Finance, to fix upon a uniform scale the registration dues to be charged on the taking of this oath by the vérificateurs.

The registration dues chargeable for this formality are fixed by the law of 22 Frimaire, An VII. (12 December 1798), cap. 10, at a tariff of either 3 francs or 15 francs, according to the nature of the duties to be performed. There is, besides, a decree of the Minister of Finance, dated 9 May 1817, directing that a fixed duty of 3 francs is to be charged for the oath taken by Government officers, and all other persons receiving pay from the State, when the pay, salary, or allowance does not exceed 500 francs a year. The result of these provisions is, that the taking the oath of all those vérificateurs, or deputy vérificateurs whose pay, &c. exceeds 500 francs a year, is subject to a duty of 15 francs, which is to be paid by each of these officers. This charge will be reduced to a fixed duty of one franc for the oath prescribed by the law of 4 July 1837, in all cases of vérificateurs who have already taken the oath and have been registered.

Clerk's fees.

As for fees for engrossing, the act of taking the oath by public functionaries in general has been declared exempt from these fees by a decision of 11 August 1807. As such an act cannot be considered the same as a judgment, any copies of the record are subject only to a fee of 1 franc for each roll. This copying fee is, therefore, the only clerk's fee payable upon the taking the oath by vérificateurs and deputy vérificateurs of weights and measures.

Lastly, the second paragraph of Article 5, with the view of relieving these officers from being subjected to useless expense, expressly states that in the event of a change of residence on a temporary mission, they are only required to have their commission and the certificate of their oath viséed at the proper office of the district to which they remove.

Custody and use of local standards, stamps, &c.

Articles 6 and 7 require no other specific instructions than those which relate to the standards and stamps entrusted to the vérificateurs, to be used under their responsibility according to the principles recited and repeated in Article 7.

Pay ficat

Article 8 relates to the pay of the vérificateurs and the expenses therein specified. This object has been provided for by the Ministerial Circular of 15 January last, to which is attached a table of the pay of the vérificateurs in the several departments, commencing from 1 Jan. 1839.

The latter part of this Article, for reimbursing to the vérificateurs the expenses of extraordinary journeys, is to be considered only as referring to journeys beyond the limits of their arrondissements. On this point also reference may be made to the judicious regulations of the Circular of 8 May 1828 which are still in force, and by virtue of which, except in cases of grave urgency, such extraordinary journeys should be first sanctioned by the Minister of Commerce, and a special allowance authorized to be charged by the officer so employed.

Susp &c. cate

Article 9 confers upon the préfets the power of suspending any officer of vérification, provided that an immediate report of any exercise of such power be made to the Minister of Commerce, &c. As a necessary consequence this power is accompanied with that of temporarily filling up the vacancy if the public service should so require. In the latter case it should not be lost sight of, that under the law of 4 July 1837, and the Royal Ordonnance of 17 April, the duties of any sworn officer can be executed only by an officer who shall also have been subjected to the oath, and under the conditions of Art. 5 requiring him, before exercising any function of his new office, to have his commission and certificate of oath viséed at the office of the tribunal of the district.

Subc tion ficat to pr and préfe

Before concluding this portion of the organization of the service of verification which relates to the *personnel*, an important regulation which is repeated in the Royal Ordonnance should be pointed out. Article 1 formally directs that the verification of weights and measures is placed under the supervision of the préfets and sous-préfets, and this principle is again to be found in Article 7. At the period when the law of 4 July 1837 is to be put in execution, much importance is to be attached to the results expected from this supervision. The préfets and sous-préfets placed under their authority are therefore to take care that reports are frequently made to them that the several duties to be performed by the vérificateurs during each year are regularly executed, and their offices kept in proper order ; these offices should be frequently visited in order to afford some security that all the apparatus is kept in proper condition, and especially the standards and instruments of verification deposited there.

§ 2.—Verification. (Art. 10-27.)

Mode verifi of M weigh meas

The three first Articles under this head are more particularly applicable to the original verification of weights and measures, which, according to Article 10, can be made only at the office of the vérificateur. Article 11 specifies one of the principal conditions required for impressing the stamp of original verification ; it is requisite also for the due execution of this and the following Article to refer to the Ordonnance of 16 June 1839, authorizing ministerial regulations for the form of weights and measures and the materials to be allowed in their construction.

Origi verifi

Trade ject t ficati their weigh meas &c.

In conformity with Article 15 the préfets will have to make out for their several departments the table of trades which ought to be subject to verification, and this table should specify the assortment of weights, measures, and weighing instruments, with which each trading firm should be bound to furnish themselves. This Article definitely decides a long agitated question, that of ascertaining how far the administration is entitled to determine what trades should be subject to verification.*

* This form of oath has since been necessarily modified.

* This question had arisen upon the construction of the Decrees of 16 May 1826, and 24 Sept. 1829, and it was not until 18 Jan. 1834, that by a decision of the Court of Cassation, the principle was adopted that the

On the other hand trade and industry are subject to so much variation, that it has been necessary in the recent Ordonnance to leave the formation of these tables to the charge of the préfets, who, from their position, will be enabled to draw them up according to the wants and exigencies of the several localities. Instructions are therefore transmitted which may be generally applicable for ensuring uniformity in these tables.

If the Ordonnance of 17 April has not repeated the provisions of that of 18 Dec. 1825, which authorized the consulting the Conseils d'arrondissements and Conseils généraux upon the formation of the tables, it does not on the other hand prohibit having recourse to the advice of these Conseils upon points in which difficulties may appear to arise.

As to the minimum quantity of weights, measures, and instruments for weighing of which the assortment for each business should consist, it is expedient also in this case to have regard to the experience of the real wants of each trade, according to the nature and extent of its dealings with the public. Every person subject to this verification should, however, be provided with the requisite weights and measures, so as not to be compelled to weigh or measure approximately only. It may be useful also to remark upon this point, that if Article 16 dispenses, under certain conditions, with a person subject to verification, who exercises several descriptions of trades, from being provided with the assortment of weights and measures required for each of them, this provision should not be taken in too absolute a sense; for example, considerations of what is required for the public health do not admit that a dealer who sells at the same time, oil, vinegar, wine, and liqueurs, should not be bound to have distinct measures to be specially used for each of these liquids.

It is to be further remarked that as Article 21 of the new Ordonnance makes hawkers subject to verification, these traders should be specified in the table, and the assortment of weights and measures fixed for each according to the nature of his business.

The préfets are also recommended to be careful not to make use in the tables of assortment of any other denomination of weights and measures than those legalised by the Ordonnance of 16 June 1839. The result will be the double advantage of avoiding all confusion and of giving a greater publicity to the denominations specially assigned to each weight and measure.

Finally, as the decrees that the préfets may issue upon this subject cannot, under the terms of Article 33, be carried into execution until approved by the Minister of Commerce, &c., he has to request that, upon the receipt of this circular, the préfets will draw up and submit to him the table of the assortment of weights and measures to be obligatory for each trade in their departments. This table shall be returned immediately with his approval if thought right, so that persons made subject to it may conform to it at the time fixed for the periodical verification in 1840.

Government was legally empowered to determine what trades should be subject to verification. They had, in fact, already so determined as follows:—

Date.	Trades subject to Verification.
10th Sept. 1819 - - 6th Aug. 1825 - -	Every trade or business requiring the use of weights and measures.
13th Sept. 1822 - -	Turners.
17th Dec. 1824 - -	Dealers in drinks, including wine from the cask.
28th Feb. 1825 - -	Wax and tallow chandlers.
21st May 1828 - -	Dealers in marine stores (*revendeurs*).
30th May 1828 - -	Retail coal merchants and silk mercers.
1st Nov. 1828 - -	Silk brokers.
4th March 1830 - -	Weavers.
31st July 1830 - -	Butchers.
17th Oct. 1832 - -	Grocers.
21st Dec. 1832 - -	Farriers.
27th March 1833 - -	Charcoal dealers.
7th Nov. 1833 - -	Brokers (*frippiers*).
5th Dec. 1833 - -	Military contractors.
9th May 1834 - -	Wholesale dealers, at their place of residence.
20th June 1834 - -	Millers, locksmiths, edge-tool makers.
3d April 1835 - -	Architects.
19th Oct. 1836 - -	Army purveyors.

And by the laws of 3 19 April and 21 27 May 1791 all money changers are to have their weights and balances verified by the police officers every three months.—(*Turbé's Verification des Poids et Mesures*, p. 432.)

Besides the chief towns in the arrondissement where the verification should, according to Article 18, take place properly every year, the préfets are charged under the same Article with the duty of designating the other communes of sufficient importance also to require annual verification, and Article 33 dispenses with such decrees being submitted for approval. Upon this point the préfets are reminded that the best way of securing protection for the public is to take care that, as far as possible, the process of verification should recur in similar communes at the same intervals of time.

Period of annual verification.

By a necessary though a temporary regulation, the same Article provides that in 1840 the verification should take in every commune without distinction. The importance of this provision need not be pointed out, which naturally gives rise to the question whether communes where the verification occurred in 1839, and would recur in 1841, should be liable to the tax for the extraordinary verification of 1840. The regulation was made indispensably necessary by the alteration in the legal system of weights and measures, and had for its object the marking with the annual stamp of verification, and without waiting for the succeeding year, the decimal weights and measures with which persons subject to verification in these communes must provide themselves in order to replace the weights and measures of the old system, their use being prohibited after the 1 Jan. 1840. As this verification, however, could not fairly constitute a new charge upon these persons, the verification which might occur in certain communes out of their due course in 1840, consequently should be made gratuitously.

Special verification in 1840.

Article 19 contains the principle of verification on the premises. Article 20 at the same time provides that under certain circumstaces this process may take place at the municipal offices. But it is shown even in the Royal Ordonnance that this exception is not obligatory on persons subject to verification who retain the power of having the verification on their own premises; whilst the vérificateur preserves the right of making it on the premises of the person subject to verification, if he deem it expedient for the public service, in the event of its being voluntarily offered at the municipal office.

Place of verification.

Under the terms of Article 19, vérificateurs are no longer required to be accompanied by a municipal or police officer. This is a consequence of their being ranked as sworn public officers. They will continue to make the requisite notes upon their portable registers, which should be vouched by the signature of the person subject to verification; and if he refuses to sign, then their proof of the refusal is to be taken as sufficient. This regulation is independent of the certificate to be given by the mayor to state whether the arrival and departure of the vérificateur is within the period fixed by the préfet, and it should be scrupulously carried out now that faith is to be placed in the evidence of these officers. This is a point to which the attention of the préfets is particularly called.

Article 21 obliges all itinerant dealers who use weights and measures to present them, during the three first months of each year, or of the period during which they carry on their business, at one of the verification offices in the district where they hawk their wares. This new provision has long been required for the protection of the public, but it has been thought right to take into consideration the mode in which these dealers who have no fixed domicile should pay the fees of verification, and as the vérificateurs are not authorized to receive the amounts of these payments, to specify also the officer into whose hands the fees should be regularly paid.

Verification of weights, &c. of itinerant dealers.

The Minister of Finance, when consulted upon this point, has given his opinion, in which the Minister of Commerce concurs, that the same course should be adopted in this case as when a hawker or itinerant dealer, who is not provided with his licence for the

year, is bound to get one in the commune where he happens to be. It is furnished to him by the mayor, upon a certificate from the comptroller of taxes stating the amount of duty to be paid, and upon a receipt from the collector for the payment of this amount. The comptroller then gives notice to the director, and includes this assessment in his first supplementary schedule of licence duties, the anticipated payment of which is marked by the collector upon the margin of the sheet to be subsequently transmitted to him.

And how fees payable for such verification.

A similar course is to be adopted in collecting the fees of verification to be paid by the itinerant dealers, with this exception, that it will be the duty of the vérificateur, in place of the comptroller, to assess, according to the assortment, the amount of charge, which should be immediately paid by the dealer to the collector and a receipt given by the latter. On seeing this receipt the vérificateur will proceed to verify the weights and measures for which the fees have thus been paid.

This officer should also report the amount of these duties and their payment to the director of taxes, and render a separate and distinct account of them, either in the schedule of duties assessed for the commune, or in a supplementary schedule. The director of taxes, with the information furnished to him, will satisfy himself that the amount assessed is included in one or the other of these schedules, and in case of omission, will himself add it to the roll of taxes to be collected, so that the collector shall be obliged to render account of its payment having been made to him. As these directions will obviate every difficulty, it is essential that they be strictly adhered to.

Article 22, and the rest contained in Section 2, do not call for any additional explanation. But it may be remarked with reference to the decrees to be issued in pursuance of Article 27, and submitted for approval, conformably to Article 50, that the notices of verification in each commune should be so arranged that all the operations may be concluded and the charge of verification fees made up by the 1st August in every year, being the latest period fixed by the concluding Article. The vérificateurs should be admonished to use the greatest diligence in the practical discharge of this duty, one of the most important imposed upon them. The regularity with which each officer may perform this service will be a good test of his zeal, for the préfets must be aware that in some of the departments this portion of the public service needs improvement.

§ 3.—Inspection of Dealings in Goods sold by Weight and Measure. (Art. 28–33.)

§ 3. Inspection of dealings by means of weights and measures, entrusted to the police.

The provisions under this head involve no alteration of the duties imposed by law upon the public officers charged with the surveillance of dealings in goods sold by weight or measure. This inspection has been specially entrusted to the officers of municipal police, and in regard to it officers of verification should not interfere, except semi-officially. This principle will be found carried out in the new Royal Ordonnance, no mention of the vérificateurs being made in § 3.

Local standards to be provided by communes for this purpose.

Reference, however, may be made to the provisions of the law of 1 August 1793, imposing upon every commune the obligation of providing standards, to be kept in the custody of each mayor. It cannot be doubted that, influenced by the repeated injunctions of the préfets, the municipal councils will see the importance of complying with these requirements of the law. A collection of the principal decimal standards of weights and measures in each commune is the more necessary, as it provides the means of comparison to the mayors and officers of municipal police, thus rendering their inspection both easy and efficacious, and it also presents to the elementary teachers the advantage of being able to place under the eyes of their pupils such models as may facilitate their acquiring a competent knowledge of a system which they are called upon exclusively to teach.

Article 32 expressly directs that vessels or casks for holding beverages, liquids, or other materials are not to be considered as measures of capacity or weight. The same direction is contained in the Ordonnance of 18 December 1825, which adds also (Art. 29) that it shall not be construed to prevent the practice of selling any quantity, without reference to legal measures, of wines or liqueurs, either foreign or of particular growths, and of a higher price than that charged for wines currently sold. But, as the new Ordonnance does not repeat this last provision, some doubts have arisen upon this point, and application has been made for an official decision to put an end to them. The terms of Art. 32 are general and applicable to every description of materials; consequently, vessels or bottles cannot, like the other measures, be admitted for verification, nor can the consumer be compelled to accept them as holding any determinate quantity. But, on the other hand, there is nothing to prevent sales being made according to the practice hitherto adopted, either by the bottle or cask, provided that no definite quantity corresponding with a legal measure be either represented or guaranteed.

§ 4.—Contraventions of the Metric Laws and Regulations, and Mode of Proceeding. (Art. 34–45.)

The law of 4 July 1837 having empowered the vérificateurs to inform against contraventions of the Metric laws and regulations without the aid of a police officer, the Ordonnance of 17 April has carefully regulated the exercise of this power, which gives an increased importance to the duties of these officers.

Nevertheless, the vérificateurs are called upon to prove only what are strictly *contraventions* of the law. The evil sought to be remedied by the new law, experience having shown its gravity, consisted in the fact that vérificateurs charged with the verification of weights and measures were obliged to call upon other public officers, to afford the necessary legal proof of offences which they had themselves discovered. A difficulty had thus arisen in the service, which it was expedient to get rid of. But the new function entrusted to vérificateurs should be limited to the power of proving contraventions of the laws and regulations relating to the Metric system. There is no necessity for extending their powers any further, and the proceedings against persons committing offences which constitute not misdemeanors, but crimes, such as fraud in the sale of food, for instance, should rest exclusively with the functions of the municipal police.

These principles, clearly understood, will prevent vérificateurs from mistaking the nature and extent of their new functions, without, however, losing sight of the obligation imposed upon them by Articles 36 and 37 of aiding, for the better protection of the public, the surveillance entrusted to the municipal authorities. They should, therefore, observe and carefully note down the several circumstances connected with either the possession or use of illegal weights and measures, in order that the information may be of service to the competent authorities; and if they discover measures in a state of oxydation, which may be hurtful to the health of the public, they should give notice to the mayor and officers of police.

Articles 38 and 39 regulate the course to be pursued in order to prevent persons subject to verification on their own premises from absenting themselves when the vérificateur is to attend, and alleging ignorance as an excuse; but Article 39 contains a special provision that should be carefully observed. As a general rule, these visits of the vérificateurs must be made and their duties performed only in the daytime, that is to say, between sunrise and sunset; yet Article 26 authorizes them to visit the premises of traders and dealers at all times when the places of sale are open to the public. In all cases, however, when the exercise of their functions is refused to them, or when they

apply for admittance to the premises before sunrise or after sunset, in places of sale which may then be open to the public, vérificateurs are not empowered to demand entrance to any house, building, or place of business, except in the presence of the police magistrates, as specified in Article 39. The préfets are requested to recommend all the vérificateurs of their department to comply strictly with this provision, the object of which is to prevent all appearance of a violation of the right of domicile.

The formalities to be gone through for drawing up, making oath of registering, and depositing informations in proof of offences relating to weights and measures, are specified in Articles 41, 42, and 43. As a further regulation, under the terms of Article 44, vérificateurs of weights and measures are placed under the supervision of the law officers of the Crown. The supervision, as the Ordonnance carefully explains, should in no way interfere with the subordination of the vérificateurs to their superior officers of Government; its object is to preserve due regularity in the duties which they are called upon to perform, consequent upon their being sworn officers of judicial police. It cannot be doubted that this regulation will be advantageous to the service of weights and measures, all the officers of which remain entirely under the orders of the préfets, and it is to be hoped that this new provision will be an improvement on the existing system, it having been adopted in order to secure on the one hand protection to persons subjected to verification, and on the other hand, the due execution of the law of 4 July 1837.

Article 5 of this law specifies the denomination of weights and measures which are exclusively to be allowed, from 1 January 1840, in public Acts, placards, and notices, as well as deeds under private seal, trade books of account, and other private written documents produced in courts of justice. There is a distinction in the terms of the provision which should not be lost sight of.

As regards public Acts, placards, and notices, any contravention of the law must be self-evident, and independent of any other proofs, and the fine is leviable as soon as the offence is known. As regards deeds under private seal, trade books of account, and other documents, on the contrary, any contravention becomes punishable only from the time when such documents are produced in a court of justice. This distinction is also in accordance with the spirit of the law, the intention being not to press with severity upon entries of transactions affecting only private individuals, or recording special information, which could only be of any real importance to the public when produced in support of claims submitted for legal decision by the constituted authorities.

With respect also to placards and public notices, the influence of language upon ideas represented by it is so positive a fact, that it cannot be doubted the toleration exhibited from the first establishment of the Metric system up to the present day, must have proved highly injurious to the progress of the system. The law can take no cognizance of ordinary language, but it is by making it compulsory on official language to use none but the proper scientific denominations that common language will be induced also to adopt them. No exception whatever, therefore, should be allowed; the préfets will inform particularly the editors of journals that they will expose themselves to the penalties inflicted by the law if they permit any insertion in their journals after 1 January 1840 of denominations of weights and measures other than those authorized. They will carefully observe also, upon all occasions, and especially in public places and in sales by auction, that the criers mention no other denomination.

In accordance with the preceding instructions under § 3, Article 45 reserves to mayors, their deputies, and to officers of police the power of laying information against offences of this kind, and enjoins them to send immediately written informations to the registrar, who is empowered officially to direct the prosecution in due form. The other public officers, and particularly vérificateurs, are bound only to give information of similar offences to the proper functionary charged with the duty of proceeding against the offender; but their active concurrence is indispensable for duly carrying out the law, and it is with this view that the préfets will have to press upon them the most urgent injunctions. The Minister of Finance has taken upon himself the charge of communicating all the requisite instructions to the registrars.

§ 5.—Verification Fees.

§ 5. Fees payable for verification.

Under this head the principal provisions of the regulations hitherto in force will be found reproduced, and they will continue to be observed.

Original verification gratuitous.

Thus, Article 46 confirms the exemption granted by the Royal Ordinance of 18 May 1838, from all fees or charges on the original verification of any weights, measures, or instruments of weighing, whether new or readjusted, which should be effected, according to Article 10, at the office of the vérificateur. With respect to the periodical verification, this is to be gratuitous only in the case of public establishments, specified in Article 24; of individuals not borne upon the rolls or subject to verification; and of persons subject to verification, so far as relates to the weights, measures, and instruments of weighing in excess of the assortment with which they are compelled to provide themselves.

Fees payable on periodical verification.

As to the amount of the verification fees to be charged, Article 47 confirms the tariff* annexed to

* The following fees on the verification of Metric weights and measures, and instruments for weighing, were authorized to be taken by the Royal Ordonnance of 18 Dec. 1825; half the fee being remitted to the manufacturer on the original verification.

Brass Weights.				Iron Weights.	
Single.		Subdivided.			
	Cents.		Cents.		Cents.
Double myriagram. (20 kilos.)	37·5	5 kilogs., composed of—		5 myriagram. (50 kilos.)	50
Myriagram. (10 kilos.)	37·5	1 double kilogr. (15 cents.) -	75	Double myriagr. (20 kilos.)	25
Demi-myriagram. (5 kilos.)	37·5	2 kilogr. (30 cents.) - -		Myriagram. (10 kilos.)	25
Double kilogram. (2 kilos.)	15·	1 kilogr., subdivided (30 cents.) - -		Demi-myriagr. (5 kilos.)	25
Kilogramme -	15·	Double kilogr., composed of—		Double kilogr. (2 kilos.)	10
Demi-kilogram. (500 grs.)	15·	1 kilogr. (15 cents.) - -	45	Kilogram - -	10
Double hectogram. (200 grs.)	7·5	1 kilogr., subdivided, (30 cents.) - -		Demi-kilogram.	10
Hectogram. (100 grs.)	7·5	Demi-kilogr., subdivided.	30	Double hectogram.	5
Demi-hectogram. (50 grs.)	7·5	Double hectogr., subdivided.	30	Hectogram -	5
Double dékagram. (20 grs.)	7·5	Hectogram, subdivided.	30	Demi-hectogram	5
Dékagram. (10 grs.)	7·5	Demi-hectogr., subdivided.	30		
Demi-dékagram. (5 grs.)	7·5	Double dékagram, and under, subdivided.	30		
Double gramme. (2 grs.)	7·5				
Gramme. (1 gr.) -					

Measures of Capacity.

	For Grain and other dry Commodities.	For Liquids.	For Milk.
	Cents.	Cents.	Cents.
Hectolitre - - - -	75	—	—
Demi-hectolitre - - -	50	—	—
Double dékalitre - - -	13	50	—
Dekalitre - - - -	10	50	—
Demi-dékalitre - - -	7	50	—
Double litre - - - -	5	20	10
Litre - - - - -	5	15	10
Demi-litre - - - -	5	10	—
Double décilitre - - -	5	10	—
Décilitre - - - -	5	10	—
Demi-décilitre, and under - -	—	10	—

Measures of Length.

Double mètre, in one piece or folding - - -	15 cents.
Folding mètre, or with hinges - - -	10 „
Plain mètre or demi-mètre - - -	10 „
Décimètre, and double décimètre - - -	5

Solid Measures.

Double stère - - - - - -	75 cents.
Stère - - - - - -	75 „

the Royal Ordonnance of 18 December 1825, as modified by the Royal Ordonnances of 2 December 1832 and 18 May 1838. But the extraordinary verification, directed in 1840, is to be effected gratuitously. It follows, therefore, that this portion of the service is to be under the same regulations as hitherto, and that the schedules of charges to be paid for the approaching operations are to be prepared conformably to the regulations now recited and the instructions accompanying them.

Mode of accounting for these fees.

In directing that the schedules of fees chargeable be prepared by the vérificateurs and transmitted to the directors of the direct taxes, as soon as the operations are concluded in the several communes included in one collecting district, Article 50 continues similar provisions contained in Article 4 of the Royal Ordonnance of 21 December 1832. But this direction has given rise to a question whether these schedules should be transmitted by the vérificateurs in the first instance to the préfets, or directly addressed by them to the directors of the direct taxes. This latter mode would have necessitated correspondence between the directors and the vérificateurs, and would be also contrary to the general tenor of the Royal Ordonnance, which places all these offices of verification under the immediate authority of the préfets and sous-préfets. It is, therefore, not only expedient but agreeable to the rules of service, that the vérificateurs should transmit their schedules of fees to the préfets, to be by them forwarded to the director of direct taxes, and upon this point it cannot be too strongly recommended to the préfets to expedite the operations of any vérificateurs who are behindhand, so as to ensure the transmission of all the accounts by the period specified in Article 50.

The last paragraph of Article 53 is to the effect that Article 3 of the Ordonnance of 21 Dec. 1832, which refers to Articles 10, 15, and 23 of the Ordonnance of 18 Dec. 1825, shall continue in force. The regulation by which the charges should not be assessed before the work is executed, but on the contrary be consequent on the completion of the work, is maintained in Article 50 of the new Ordonnance ; Articles 10, 13, 15, 24, 28, 29, and 48 of which in like manner repeat the now recited provisions of the Ordonnance of 1825.

Allowance for collection.

It does not belong to the department of the Minister of Commerce, &c., to refer to the allowances payable under Article 54 to Treasury officers, and which should be fixed by the Minister of Finance. But the existing prohibition against all officers of verification taking any part whatever in the collection of the dues,

Vérificateurs prohibited from collecting fees, or receiving any sums whatever.

accepting any offer or promise, and receiving or demanding any gifts, presents, or pay, from those persons whose weights, measures, or weighing instruments are verified by them, may here be emphatically repeated. The préfets are requested to take care that no one is left in ignorance of this prohibition, and at the same time to bear in mind that every officer disregarding it will be liable to the penalties adjudged against peculation by Article 177 of the Penal Code, to the terms of which attention should by especially called. Vérificateurs guilty of being thus forgetful of their duties would be the less worthy of any indulgence, from their superior officers of the administration having neglected nothing to better their position and increase their importance.

Land Measures.

Double dékamètre	25 cents.
Dékamètre	25 „
Demi-dékamètre	25 „

Instruments for weighing.

All balances, the beams of which exceed 65 centimètres in length, are considered as warehouse balances (*balances de magazin*), and those of a smaller size, with a beam not exceeding 65 centimètres, are considered as balances for the counter (*balances de comptoir*).

The verification fees are as follows:—

Warehouse balances	each 50 cents.
Balances for the counter	„ 25 „
Weighing machines (*balances-bascules*) authorized for wholesale trade transactions, constructed to carry from 50 kilogs. up to 100 kilogs. inclusive	each 1 fr.
Similar weighing machines, constructed to carry more than 100 kilogs.	„ 2 fr.

The special weights constructed by these weighing machines being liable to periodical verification (Art. 24 of the Royal Order,) the same fee is authorized to be charged for each as for any other weight of the same description and denomination. For the original verification of these weights, half the fees is remitted to the maker.

Steelyards (*Romaines*) divided with a decimal scale of weights and carrying up to 40 kilogs. inclusive	each 50 cents.

On each steelyard for wholesale business, and carrying from 40 to 200 kilogs., the fee is to be calculated at the rate of 25 cent. for every double myriagram of the greatest weight which it is constructed to carry, not reckoning less than a double myriagram.

Steelyards carrying 200 kilogs. and upwards, each 2 fr. 50 cents.

§ 6.—General Provisions.

(Art. 55, 57, &c.)

§ Gener vision

No observation is needed upon the two Articles contained under this head, and it may be sufficient to remind the préfets, in conclusion, that the orders issued by them in reference to weights and measures, for duly carrying out the laws and regulations not repealed by the law of 4 July 1837, and Article 56 of the Ordonnance of 17 April last, should, under the terms of Article 33, be submitted for the approval of the Minister of Commerce, &c., save as excepted by Article 18 of the same Ordonnance. It cannot be too strongly impressed upon the préfets to act strictly in conformity with this provision, which has for its object to prevent any step being taken contrary to the general regulations and the uniformity of the service. It may happen indeed that the execution of the new Ordonnances may require some further explanations to be given, and any representations which may be made will receive due consideration, and no time will be lost in replying to them.

Notice issued prefet appro Minis Comm

(Signed) *L. Cunin Gridaine,*
Minister of Commerce, &c.

Official Circular Instructions on the Form and Material of Metric Weights and Measures in France, and the Mode of Verification.

Circul 15 Sep on cor tion a verific of wei &c.

The official instructions on the form and material of Metric weights and measures in France, and the mode of verification, dated 15 Sept. 1839, and bearing the signature of the Minister of Commerce, &c., were forwarded to the préfet of each department, together with a copy of the Ordinance of 16 June 1839, upon which they were founded. They were to take effect from the 1 Jan. 1840, and in substance are as follows :

Preliminary Instructions.

Prelir instru

The chief object of the Ordonnance having been to lay down the general regulations to be in future observed in the construction of new weights and measures, the Government thought it right to take into their consideration the value of the large number of Metric weights and measures actually in use, the immediate discontinuance of which did not appear to be indispensably called for. Persons subject to verification were, therefore, permitted to continue the use of such weights and measures, upon complying with the conditions of Article 2 of the Ordonnance for admitting these instruments to periodical verification. At the same time, the permission thus granted to traders was not to retard indefinitely the establishment of uniform weights and measures ; and vérificateurs were directed to take especial care that such weights and measures were not got up anew, but that they should be replaced by new weights and measures in conformity with the table annexed to the Ordonnance.

Existi Metri weigh meas tolera period recur

But t repla new when &c.

The weights and measures, the use of which was to be discontinued, were not only those of the old system, but all those of the Metric system other than those specified in the legal table, for instance, weights of 25 kilogrammes.

All of be dis tinue

In conformity with Article 4, drawings and engravings of the legal weights and measures to be exclusively used from 1 January 1840 were being prepared, and copies would be forwarded, together with brass standards and other models, to complete the furnishing of the several bureaux. It was hoped that the first of these would be sent early in October and the rest in the course of November, until which time any demands made in regard to them would have to be postponed.

Local dards model of leg weigh meas be fu to the sever offices

New and detailed instructions for the construction and verification of weights and measures, drawn up in conformity with the provisions of the Royal Ordonnance of 16 June would very shortly be forwarded. Meanwhile it might be useful to observe that the provisions embody the general principles which should regulate the construction of the several instruments; and the vérificateurs would be enabled to overcome any temporary difficulties that might arise, by acting strictly upon the terms of the Ordonnance, and as to any matter not therein provided for, by referring to the former instructions issued in 1827.

All the regulations contained in the Ordonnance of 16 June 1839, and the annexed tables, being formal and imperative, it becomes of essential importance that they should not be departed from in any instance or under any pretext; vérificateurs on their part should take particular care that the manufacturers conform strictly to these regulations, which can be easily carried into effect under the special instructions just referred to. The préfets must have remarked the most important modifications resulting from the Ordonnance of 16 June 1839, which are as follows:—

1. The form of cast-iron and brass weights is no longer arbitrary (*facultatif*), in consequence of the Decree of 27 April 1800 (7 floreal, an VIII) being abrogated.
2. The use of special weights for weighing machines is prohibited.
3. Wooden measures of capacity are to be constructed of oak only, and are to be furnished at the upper edge with a rim of sheet iron.
4. Pewter measures of capacity are to be made of a specified minimum weight of metal for each denomination of measure.
5. Such steelyards as are not found to oscillate properly are prohibited.
6. Measures representing the weight of oil are suppressed.

The préfets should observe that in section 5 of the Ordonnance, brass weights of a kilogram, or one of its parts, in the form of conical cups, are allowed. Considering that in every decimal series there should be two equal weights, and it is essential that these two should be alike in all their dimensions, so as not to expose the public to fraud or error by putting in circulation weights of the same denomination but differing in size, by which one weight might be mistaken for the double of the other, it has been determined that a new pattern of a box of such weights should be authorized, in which the weights are so arranged as to get rid of the objection hitherto experienced in decimal weights constructed in the form of conical cups. A copy of this pattern will in due course be transmitted, and will serve to regulate the making of new weights of this description.

In addition to balances with equal arms, weighing machines, and steelyards mentioned in section 6, other weighing machines appear to be in use which have been officially authorized and which ought still to be allowed, provided that they accord with the conditions prescribed for their proper construction and accuracy. In communicating the consequent instructions to the vérificateurs of their departments, the préfets will at the same time impress upon them that every weighing instrument which differs in any way from the usual form, or presents any novelty in its mode of construction, should be submitted to a preliminary examination, before the official authority can be given for using such weighing instrument for trade purposes. It is of importance for the security of the public to watch that this regulation be strictly carried out.

On the other hand, and in order to prevent any complaints, the préfets should give notice to the vérificateur that the provisions of the Ordonnance of 16 June, with which the manufacturers are particularly interested in making themselves at once acquainted, are not to be strictly carried out until after 1 January next; meanwhile, all new weights and measures, either now finished or in course of completion, may be admitted for original verification, provided they are in conformity with the former instructions contained in the published summary of 1827.

The préfets will doubtless deem it expedient to give great publicity to the Ordonnance of 16 June 1839, of which a sufficient number of copies will be forwarded for immediate distribution to the sous-préfets, the vérificateurs, and the principal manufacturers of weights and measures in the several departments.

Detailed Official Instructions.

Detailed instructions.

No. 1.—Instructions for the Construction of Measures of Length.

1. Construction of Metric measures of length.

The measures of length are—

The dékamètre = 10 mètres.

Mètre.

Names of measures of length

Décimètre = 0·1 mètre.
Centimètre = 0·01 mètre.
Millimètre = 0·001 mètre.

In order to facilitate measuring, there are other measures, the double or the half of those stated above.

Measures of length may be made in the form most convenient for the use to which they are destined; but they should be constructed of wood, metal, or other solid material.

Manufacturers should in the first instance take care to examine the standards at the bureau de vérification of each communal arrondissement, and especially to procure exact copies, at least of the mètre and its divisions.

Construction of wooden mètres.

The woods most convenient for making mètres, and all measures of length generally, are those which are sufficiently hard, are easily worked, and are not sensibly affected by damp or dryness; such as oak, walnut, service wood (*cormier*), and hornbeam (*alisier*), provided they are well dried.

After having properly prepared the wood, either square, flat, or rounded, it is to be cut to the proper length. The square form being more easily worked, it is adopted in preference. If each side is made of the breadth of two centimètres it will have the requisite strength and lightness.

Wooden mètres should have their ends furnished with a tip of brass, or of wrought or sheet iron. But the thickness of these tips should be allowed for in the total length. Thus, if the thickness of the sheet iron be three millimètres, the wood should be cut six millimètres less than the model mètre.

The tips are to be fitted to the ends of the mètre and fixed by a pin riveted and flush with the surface. But before finishing the riveting, it should be ascertained that the length of the mètre agrees with that of the model, or that the difference is not greater than that tolerated.

Subdivision of mètres.

Several methods may be used for subdividing the mètre. The most simple is a machine which impresses the dividing lines and the figures upon the measure at a single operation.

Every mètre should be divided into centimètres; at every ten centimètres a small pin is driven in between the dividing lines, and three pins are placed at the middle line; and in order to observe these marks the more distinctly, the figures 10, 20, 30, &c., are impressed in the wood by a method to be herein-after referred to, supposing always that the figures are made by hand or otherwise, and not by making use of a machine which simplifies the operation.

The maker is bound to imprint on the measure the word *mètre*, and also his name or mark.

These marks are generally impressed with punches and a hammer, and this method may serve for impressing the figures 10, 20, 30, &c., above mentioned.

Folding mètres

Mètres may be constructed in two, five, or ten pieces, joined together by screw joints or hinges, and either folding from being made of thin pieces overlaying each other, or extended in a straight line being held together by pins and studs.

The other conditions of strength and accuracy prescribed for measures of length must be observed in folding mètres.

Walking-stick mètres.

If mètres are made in the form of a cane or walking stick, they must be constructed as follows :—

The canes must be protected at the top and bottom with some material that does not easily wear. The length of the mètre is to be taken from the upper surface of this material at the top to the lower end of the material at the bottom, and this last should have a point projecting to save the lower end.

If each of those protecting pieces are made in two parts, joined by a screw and nut, the length of the mètre may then be taken between the ends of the parts that are fixed. The measure would then be always the same length, and the moveable piece at the top could be made of any form to please the taste.*

The mètre cane may be divided into décimètres, and the upper décimètre subdivided into millimètres, using to mark the divisions merely small pins of brass, wood, or bone, of a distinct colour from that of the cane, and levelled with its surface.

Double Mètres.

Double mètres of wood made in one piece, or folding, are subject to the same conditions of strength and accuracy as mètres, as regards both their construction and their divisions.

When a double mètre is made by joining two mètre canes, they should have at the ends where they join, one a screw, the other a nut; this joint is ordinarily made of brass.†

Dékamètres, double and half Dékamètres.

Dékamètres, &c., chains for measuring land.

Dékamètres are chains‡ intended to measure land. They are composed of several links formed of strong iron wire. Each link may be two décimètres long, including the ring which joins the links together. The rings at every mètre should be of a colour distinct from the other part of the measure.

The first and last link should have a handle joined to each, by which the dékamètre may be held, either when it is placed upon the land to be measured, or when it is to be applied successively to one part after another of the whole length to be measured. As this process is generally performed by fixing in the ground, inside the handles, either pegs, or pins of iron wire of the same thickness as that used for the links, it is necessary that the extreme length of the measure should exceed ten mètres by a quantity equal to three thicknesses of the iron wire, being two for that of the handles, and one for the two halves of the pins.

As to the method of constructing these measures, it is necessary only to cut the wire for the links, rings, and handles of equal lengths, and to give them exactly the same curve.

The only difference in the construction of double dékamètres, used for measuring considerable lengths, consists in the greater thickness of the iron wire, and in the length of the links, which is generally a half mètre instead of two décimètres.

Demi-dékamètres are constructed in a similar way to dékamètres.

Wooden demimètres and smaller measures.

Makers of demi-mètres, double décimètres, and décimètres should use in preference such woods as box or service wood (*cormier*), or other close grained wood, in order that the divisions of the millimètre may be sharp, and easily seen.

In order to facilitate the use of measures, and to avoid confusion, the division lines of demi-centimètres should be longer than those of the other millimètres, and shorter than those which mark the centimètres.

In constructing these measures, the greatest difficulty is in making the divisions exact, and the readiest mode of accomplishing it with precision is to make use of a machine which marks at one blow all the divisions, figures, and denominations.

These measures may be made in one piece, or in two pieces firmly joined, either with a hinge or in any other way.

Metal measures of length.

Such measures of length as are made of metal, either in one piece or folding, and may be constructed for trade purposes, are subject to the same conditions as measures made of wood, so far as regards the mode of their construction and their divisions ; with the exception of the amount of error to be tolerated in their several denominations, according to the following table.

Instruments not applicable to scientific measures.

As for such measures as are required for scientific purposes, it would be useless here to refer to them, in detailed official instructions, which are applicable only to measures constructed for trade purposes.

Conditions for receiving measures for verification. Errors tolerated.

Manufacturers are to be informed that measures presented for verification will be rejected if the following conditions are not complied with :—

1. If the difference in the whole length is greater than that specified in the following table :—

Names of Measures.	Errors tolerated. In excess, for Wooden Measures.	Errors tolerated. In excess, for Metal Measures.
Double dékamètre, Dékamètre, Demi-dékamètre, in the form of a chain*	10· millim.	10· millim. 3· „ 2· „
Double mètre	1·5 „	0·2 „
Mètre	1· „	0·2 „
Demi-mètre	0·6 „	0·1 „
Double décimètre	0·4 „	0·1 „
Décimètre	0·3 „	0·1 „

2. If the length of the links of the décamètre, its double, or half, be not either 1, 2, or 5 décimètres.
3. If folding measures be not made in 2, 5, or 10 pieces.
4. If the measures are not made of sufficient solidity.
5. If the subdivisions of centimètres and millimètres be not exact, sharply defined, and the lines at right angles with the length of the measure.
6. If metal tips be not fitted to the ends of the mètre, its double, and its half.
7. If the denomination of each measure, as well as the name or mark of the maker, be not imprinted upon them.

No measure, whether it be in one piece or composed of several pieces, other than those specified in the above table, is to be stamped or verified.

No. 2.—Instructions for Verifying Measures of Length.

2. Verification of measures of length.

Measures of length, with a view to their verification, may be classed under two distinct heads :—

* If the mounting of the cane be attached by an iron screw and nut, there may be some difficulty, in course of time, to separate the moveable screw, on account of the rust produced on the iron by damp. To prevent this inconvenience, the screw and nut may be made of brass ; but unless the screw is made long enough and with a very fine thread, there is a risk of losing the moveable piece, as the continued jars which the cane receives when used tend to unscrew it by slow degrees. This last inconvenience, may, however, be avoided by means of a peculiar arrangement of the nut and screw, to be referred to in the following note.

† In order to give more solidity to the double mètre at the joints, and to prevent their separating easily, the screw and nut may be made as follows : The nut should be made in a short tube or cylinder of a smaller diameter than that of the mounting, and there should be a space left between the screw and the mounting equal to the thickness of the tube. By this arrangement, whilst the screw enters the nut, the tube fills up the space round the screw, and thus the screw is encompassed around both by the nut and by a socket or ferrule, which makes a very solid joint, and the double hold of the nut in the screw and the tube in the socket keeps the two parts firmly fixed together.

‡ See Circular, 10 June 1860, allowing also ribbons of steel.

* The specified amount of error is tolerated both in excess *and in deficiency* in the case only of measures in the form of a chain. The length of such dékamètres, and of the double and half dékamètre, is to be taken from the inner part of one of the handles to the inner part of the other, allowance being made for the thickness of one of the links. The reason is as follows :—When a chain is used for measuring land, the first thing is to drive a pin or peg into the ground, and to place the handle of the chain around it ; the chain is then stretched out, and a second pin driven in inside the other handle. The first pin and the chain are then moved, and the same process repeated from the second pin. These pins are generally made of iron wire of the same diameter as that used for the chain. The result, therefore, is that the length is thus measured on the ground in each process includes the width (or thickness) from the centre of one pin to the centre of the other, and consequently the length of the chain should be taken as above specified.

1. The mètre and its parts, which are the demi-mètre, double décimètre, and décimètre; 2. Multiples of the mètre, viz., the double mètre, décamètre, and double décamètre.

When a mètre is to be verified, it should be placed so that the edge to which the division lines reach is immediately opposite that of the standard mètre, the left end being close to the stop and the upper surface level with that of the standard. It is evident that if the division lines of the two measures exactly coincide the mètre is accurate. This coincidence cannot exist under two circumstances :—1. If the total length of the measure compared is less than the standard, when the mètre must be rejected ; 2. If the total length exceed that of the standard, when in order to pass the mètre the amount of error must not be greater than that tolerated, and be nearly equally distributed throughout the whole length ; this last provision is necessary, as it very often happens that the error is unequally divided.

Practically, when a mètre is divided by a machine that is itself defective, the several divisions, which taken together constitute the whole length, cannot be all exact. The same thing occurs in measures divided by hand. It is consequently possible that there may be some parts of the mètre where the error is greater than that allowed for the whole mètre, or at least greater than that allowed for measures of the same length as that in which the error is found. This would occur, for instance, if the error at the demi-mètre exceeded ·6 millim., the amount tolerated for demi-mètres.

In all such cases the measure should be rejected ; and as it cannot but be useful to manufacturers to know the cause of such rejection, in order that it may be remedied, it is right that vérificateurs should endeavour to ascertain it. One of the simplest methods is to compare two of these measures together, so that the first divisions of the one are opposite the last divisions of the other ; it is then easily seen where the greatest difference occurs.

Whenever the dividing lines of the measures do not coincide with those of the standard, the vérificateur should ascertain the difference ; with a little practice this may be easily done by the eye, without the aid of a measuring instrument.

These instructions for verifying mètres are generally applicable to all lesser measures.

Measures exceeding a mètre are, as already stated, the double mètre, dékamètre, and double dékamètre.

To render double mètres more portable they are generally constructed in two equal parts. In such case their verification is not more difficult than that of mètres. But if double mètres are made in one piece, and the vérificateur has no standard of this length, another process must be resorted to.

One method is to take the double mètre and verify half of it, marking with a pencil any difference found ; the double mètre is then to be turned halfway round, and the other half verified. Any errors that may be observed should be noted, bearing in mind that in the second comparison such errors would be in the opposite direction to those of the first ; that is to say, if in the first comparison the errors were in excess, they would appear in deficiency in the second comparison.

The metal ends slightly projecting, which are most generally fitted to the ends of this measure, do not prevent the divisions being brought close to those of the standard, if they are subjected to a slight pressure.

Another method consists in procuring two mètres, one of which as a projecting piece or shoulder (*talon*) at the end, or a double mètre with a similar projection. The two mètres, or double mètre, should be placed upon small supports on a table, and the double mètre under comparison should be brought close so as to touch the projecting piece, and that the divisions be opposite each other. It is hardly necessary to observe that the two mètres, or the double mètre, thus used for comparison, should have had their divisions préviously verified.

Dékamètres, as well as double and demi dékamètres, are generally chains made of iron wire. Their length hardly allows them to be verified by comparing them with a single standard of the same length. The accuracy of their divisions not being so essential as that of the other measures, they may be verified by placing them upon a long piece of paper affixed to the floor or to a well levelled wall, and conveniently divided. The comparison may be made in one process or more, according to the facilities there may be for the length of the paper. Dékamètre &c., chains.

It must not be forgotten that the total length of these chain measures must be taken from the *inside* of each handle, deducting also the thickness of one of the links, for the reasons already stated.

The verification of all these measures of length is subject to the before-mentioned conditions for receiving measures for verification, including the errors tolerated. Verification of all these measures subject to the conditions already stated.

No. 3.—Instructions for the Construction of Measures of Capacity for Grain and other dry Commodities.

Measures of capacity of grain and other dry commodities are to be constructed in the form of a cylinder, with the internal height equal to the diameter. They are as follows : 3. Construction of dry measures of capacity.

Names.	Contents.	Height and Diameter.
*Double hectolitre** -	200 litres	634· millim.
Hectolitre - -	100 „	503·1 „
Demi-hectolitre -	50 „	399·3 „
Double dékalitre -	20 „	294·2 „
Dékalitre - -	10 „	233·5 „
Demi-dékalitre -	5 „	185·3 „
Double litre -	2 „	136·6 „
Litre - -	A cubic dékamètre.	108·4 „
Demi-litre - -	0·5 litre	86· „
Double décilitre -	0·2 „	63·4 „
Décilitre - -	0·1 „	50·3 „
Demi-décilitre -	0·05 „	39·9 „

Names and form of dry measures.

The dimensions thus specified have been calculated on the hypothesis that the measures are perfectly cylindrical inside, without any irregularity that may diminish their volume. But this is not ordinarily the case in wooden measures, not only from the wood being generally made to overlap, but also because there are several of these measures, which, on account of their size, or the use intended to be made of them, require that they should be furnished with iron frames, and hoops and bolts of iron. It should, therefore, be understood that the specified diameter is the mean diameter, and the height that which the measure should have, in order to contain the proper quantity.

The first requisite for a manufacturer of wooden measures of capacity is to procure a mètre accurately divided, similar to the brass standard deposited in each bureau de vérification, and with the several lengths above specified marked upon it with iron pins, which may serve to determine the diameter and height of each measure.

He should also make himself thoroughly acquainted with the models of the measures of capacity deposited in the same bureau, so as to enable him to conform to the following regulations.

The only wood that is allowed to be employed for the construction of these measures is oak.† It must be cut into thin pieces of the proper size and thickness for the measures required, and this operation must be Construction, &c. of wooden measures.

* See Circular, 2 May 1840, authorizing the double hectolitre.

† Wood of beech and chesnut also allowed by Circulars of 5 Nov. and 27 Nov. 1852, and 25 Oct. 1856.

carefully performed, as the accuracy of the measure depends much on the equal thickness of the wood, which should be left some months to dry before working it into shape.

Body of the measure.

The large measures only require a double thickness of wood * for the body of the measure, for all others a single thickness only is used. But as it may be difficult to find one piece of wood of sufficient width for the whole height of the larger measures, it is necessary in such cases to have two pieces one above the other, and sometimes three for the hectolitres.

Much attention should be given when choosing the wood for the body of the measures, and not less attention is required in putting it together, so that the measure may have the requisite strength and accuracy.

Rims.

When measures are made of two thicknesses of wood, one within the other, the outer one is made rather longer, in order to hold the bottom and the lid. In other measures rims are fitted on for the same purposes.

Bottoms.

The difficulty of procuring pieces of wood of a width equal to the diameter of large measures, frequently obliges the bottoms to be made in two pieces. The bottom of other measures should be in one piece. In every case the bottom should be exactly fitted.

Under frame of the bottom.

When a measure is full, all the weight of its contents rests upon the bottom, and upon the under frame which supports it (*jable*). It is necessary, therefore, to make this under frame of sufficient strength, not only by the number and thickness of its several pieces, but also by the mode of fixing it to the lower rim. This under frame should press the bottom close to the lower rim of the body of the measure.

Strengthening with sheet iron.

Wooden measures should be furnished at their upper edge with a rim of sheet iron.† The larger measures should also be strengthened on the outside with strips of iron, to give them the requisite solidity. And according to the use for which they are intended, they may have hoops or plates of iron fixed inside, to which crossed frames (*potences*) may be fixed with nuts and screws; they may also have legs of iron or of wood, and handles at the side. When the measures have three legs, these should be fixed on with bolts and nuts, and should be provided with two wrought-iron ferrules and a large-headed nail. Measures mounted on legs should be constructed of the greatest solidity, particularly as regards the under frame supporting the bottom. All the measures are allowed to be strengthened with iron, and the large measures must be so strengthened.

Brass or sheet iron measures.

Dry measures of capacity may also be constructed of brass or sheet iron, provided that they are sufficiently strong, and are in accordance with the prescribed form and dimensions. The different parts of which they are composed must be securely and permanently put together, so as to prevent any alteration in the size. These measures should also have two bits of pewter affixed on them, to facilitate their receiving the stamps of verification.

Their names, &c. to be inscribed on the measures.

All measures of wood, brass, or sheet iron must bear their proper denomination inscribed in legible characters, as well as the name or mark of the maker.

Conditions of verification.

Measures presented for verification are not to be admitted if they have one or more of the following defects:—

1. If the height of the measure, and the mean diameter taken at any part of the height, are deficient; unless the differences, the one in excess, the other in deficiency, do not exceed $\frac{1}{5}$ th part of the dimensions specified in the regulations;

2. If all the parts are not solidly and permanently put together;

3. If the bottom has not sufficient thickness to prevent its bulging, and if it is not firmly held between the body of the measure and its under frame;

4. If the horizontal bar of the strengthening iron frame be not below the edge of the measure, and if the vertical bars be not made with a shoulder at the lower end, against which the bottom is to be pressed by means of a screw from below;

5. If in wooden measures, from the hectolitre to the dékalitre inclusive, which only are allowed to have a grooved rim (*gorge*) fitted to them, this grooved rim is not at least two centimètres in height, and if it is not fixed to the edge of the outside of the wood by nails riveted or clenched;

6. If the wooden measures are not made of oak, with the upper edges furnished with an iron rim, and if, from and including the double dékalitre upwards, the larger measures are not strengthened with an iron frame;

7. If the measure does not bear its proper denomination, as well as the name or mark of the maker.

In measures strengthened with an iron frame, or other projecting bodies, the height must be somewhat more than is specified in the regulations, on account of the volume of this material.

Measures found deficient upon comparison, are to be rejected. Others are to be allowed, the errors of which do not exceed $\frac{1}{100}$th part for all measures made of oak, part $\frac{1}{300}$ for all large measures of brass or sheet iron, and $\frac{1}{200}$ part for all measures of the same materials of the double litre and under.

Vérificateurs are authorized to keep by them for some days any wooden measures which they may think liable sensibly to diminish in volume from drying.

No. 4. — Instructions for Verifying Measures of Capacity for Grain or other Dry Commodities.

The series of legal measures for grain and other dry commodities and the regulations for their construction have been already stated in the preceding instruction, No. 3.

The vérificateur should keep this instruction in view, as well as the following regulations. Before proceeding to the actual verification of measures delivered to him, he should first satisfy himself that they fulfil all the prescribed conditions, as to accuracy and solidity of their construction. If the vérificateur should discover any defect in a measure which renders it inadmissible, he will not proceed with any further verification although it may contain the exact measure, and will verify those measures which are in accordance with the regulations for their construction.

The dimensions of the several measures are specified in the preceding instruction No. 3. In order to satisfy himself that a measure submitted for verification is constructed of these exact dimensions, the vérificateur is to be provided with a gauge, or brass rule, having several projections, the side of each of which, being made at right angles with the length of the gauge, marks the height and the diameter of each description of measure.

This gauge is to be inserted in the measure and placed against the side perpendicularly to the bottom. If, when the end rests upon the bottom, the projecting part which marks the proper height of the measure rests upon its upper edge, the height is accurate.

The same gauge is then applied to the upper diameter of the measure, and if this diameter is found to be accurate, the measure is to be taken as being of the requisite dimensions.

As, however, wooden measures are not always perfectly cylindrical, it is right to apply the gauge at different parts.

It may happen that the manufacturer may have made his measure a little too high, not only to facilitate its adjustment, but to compensate any diminution in its capacity from the inequalities of the wood. The vérificateur should take into account any small differences capable of being thus compensated, which, unless they are excessive, need not prevent him from verifying one of these dry measures of capacity.

Experience has proved that the surest method of verifying the contents of wooden measures is to use a round grain, very small, well dried, and that runs freely. Rape seed, well cleaned from its straw, from

* See also Circulars, 8 June 1854, 18 Nov. 1857, and 20 May 1861.
† Brass rim allowed by Circular, 2 April 1860.

dust, and every foreign matter, is the most convenient for the purpose.

This grain is to be let fall into the standard measure by the opening in the bottom of a hopper which is to regulate its fall. A strike, or wooden rule is then passed along the rim of the standard, so that it is exactly filled with the grain.

The grain is then to be poured from the standard into the hopper, and thus to fall in the same manner into the measure under comparison, when the strike is also to be passed along the rim of the measure. If not exactly filled with the grain, it is too large ; if there is more grain than will fill it, the measure is too small.

In this last case the measure is to be rejected ; in the first case, the maker can adjust it by reducing a proper portion of its upper edge.

utions used in nea- ment.

1. The choice of the grain is of importance. It must be very small, round, dry, and regular. It must not be kept in a damp place, or exposed to dust.

2. Care must be taken not to put more grain into the hopper than is sufficient to fill the measure under comparison. For this purpose, the first process is to fill the standard any how with the grain, which is then to be poured into the hopper. The standard is then to be placed under the hopper, the grain to be let fall into it, and the strike passed over it ; after which, the grain is to be again poured into the hopper for the next process.

3. It is essential that the lower opening of the hopper should be closed whilst the grain is being poured into it, in order to avoid errors which might result from the irregular fall of the grain.

4. The measure into which the grain is to fall must be placed in such a position that the grain falls well into the middle, and spreads regularly towards the edges. This regulation will be dispensed with in verifying measures provided with an iron frame, because the grain which falls upon its bars might rebound outside.

5. Before commencing the process, care must be taken to remove from the bench, or piece of wood upon which the measure is placed, any grain remaining from a previous comparison, so that any which may be thrown from the measure by the strike may be easily collected, and its quantity ascertained, if necessary.

6. No time must be lost after the grain has fallen in passing the strike over the measure, as the grain settles down by degrees ; and thus, if there is any delay, an accurate measure might appear too large.

7. For the same reason, if the hoppers are connected with the floor, there should be no walking about during the process, as the movement of the floor has the effect of making the grain settle down.

8. The strike should be passed over lightly and quickly, in order not to press the grain together. This operation should, therefore, be begun by placing the strike on the edge of the measure ; the grain should then be moved gently, so as exactly to fill all the parts which remain vacant, especially towards the edges ; after which any surplus is to be thrown off upon the bench.

9. It is expedient frequently to replace the grain in the standard, not only to add, if necessary, any grain which may have been lost during several successive comparisons, but also to remove any superfluous quantity, experience having shown, that after several processes grain swells from the heat produced by friction and occupies more space ; without this precaution, indeed, there might be a risk of rejecting measures that are really accurate, and passing others which are too arge.

thod of time if a sure is tisfable.

No measure which is too small can be received. Thus, whenever a measure under comparison cannot hold all the grain in the hopper, which is known to be the quantity that ought to fill the standard, the measure must be at once rejected without further examination.

The error to be tolerated is $\frac{1}{100}$th part in excess for all wooden measures, and $\frac{1}{500}$th for brass and sheet iron measures.

When a measure under comparison is found to be larger than the standard, which will be shown by the vacant spaces remaining after the strike is passed over, a quantity of grain equal to the amount tolerated in excess is to be added, and the strike again passed over ; if the vacant space is not then filled, it will prove that the error exceeds what is allowed, and the measure cannot be admitted for verification.

Verification of brass and sheet iron measures.

Brass and sheet iron measures may be verified with grain like wooden measures. When a more exact process is wished for, they may be verified either by the weight of water contained in them, or by the means stated in the instruction for verifying liquid measures.

Reverification of wooden models for verifying measures.

Those vérificateurs who are not supplied with metal standards for measures of capacity greater than the double dékalitre should, at least twice a year, verify the accuracy of their large wooden measures, which are liable to alteration from dryness or dampness. They should proceed to verify them thus :—

For the demi-hectolitre they should carefully fill the standard brass double dékalitre and dékalitre, so as to obtain five dékalitres of grain, which should be poured successively into the hopper ; they should then let this grain fall into the demi-hectolitre which they wish to verify ; and they should repeat the process several times.

If the measure is exactly filled, without leaving any vacancy, or without any excess, and if there is the same result every time, they may be satisfied that the measure is accurate. If it is found too small, the quantity of grain thrown off by the strike is to be carefully collected and poured into a small measure ; and every time that the measure is used, until it is adjusted or replaced by another measure, a quantity of grain equal to this excess is to be added.

If the measure is found to be too large, its excess is to be taken into account in estimating the amount of error to be allowed ; that is to say, if the model double dékalitre is found to be too large by a décilitre, no greater amount of error should be tolerated, in comparisons made with it, than a décilitre, in the measure compared.

When by these means an accurate demi-hectolitre shall have been obtained, it will be easy by the same process to get an accurate hectolitre.

General regulations for verifying dry measures of capacity.

1. The dimensions of measures of capacity for grain and other dry commodities are those specified in instruction No. 3.

2. In measures strengthened inside by iron frames or other projecting bodies, the height is to be somewhat greater than that specified in the preceding article, on account of the volume of such matter.

3. The defects which should cause a measure to be rejected are the following :—

If the height and diameter of the measure are not conformable to the regulations ; unless the difference of the one in excess and the other in deficiency do not exceed $\frac{1}{40}$th part of the regulation size;

If all the parts are not solidly and permanently put together;

If the bottom is not thick enough to prevent its bulging, and if it is not held securely between the body of the measure and the under frame (*jable*);

If the horizontal part of the strengthening iron frame is not found to be below the edge of the measure, and if the vertical bars are not furnished with a shoulder at the lower end, against which the bottom is pressed by a screw from underneath;

If in wooden measures, from the hectolitre to the dékalitre inclusive, which only are allowed to be used with a yoke (*gorge*), the groove for the yoke is not at least two centimètres in height, and if it is not fixed upon the rim of the measure, or on the outside by nails riveted or clenched;

If the denomination of the measure is not inscribed upon it legibly and durably, and if the maker has omitted to affix his mark.

4. Measures found upon comparison to be too small are to be rejected. As for others that hold too much, those only are to be admitted whose errors do not exceed $\frac{1}{100}$th part for all wooden measures, and $\frac{1}{500}$th part for large brass or sheet iron measures, and $\frac{1}{200}$th part for all measures of the double litre and under, made of the same metals.

5. Vérificateurs are authorized to keep by them, for some days, any wooden measures which they may think liable to diminish sensibly in volume from drying.

5. Construction of liquid measures of capacity.

No. 5.—Instructions for the Construction of Metric Measures of Capacity for Liquids.

Part I.

For Liquids generally.

Their names, materials, form, dimensions, and errors tolerated.

Measures of capacity for liquids are,

1. The hectolitre = 100 litres.
2. The dékalitre = 10 „
3. The litre = a cubic décimètre.
4. The decilitre = 0·1 litre.

It is allowed to use the double and the half of each of these measures, and also the double centilitre and the centilitre.

The five measures of the hectolitre, demi-hectolitre, double dékalitre, dékalitre, and demi-dékalitre, to be used for liquids, must be constructed in the form of a cylinder whose internal height is equal to its diameter, in accordance with the dimensions specified in the regulations for measures of capacity for dry commodities. They may be made of brass and of sheet or cast iron, but are subject to all the conditions prescribed in the regulations in regard to the mode of construction and their solidity. They must also be carefully tinned or lacquered, so as to preserve them from all oxydation, or from anything that may affect them so as to cause any danger in using these kinds of measures.

Measures from a double litre to a centilitre are to be made exclusively of pewter,* and in the form of a cylinder whose internal height is double its diameter.

They may be made with or without handles, or with a brim prolonged to form a spout, or with a cover attached by a hinge to the upper part of the handle.

The dimensions of pewter measures, both as to height and diameter, the errors tolerated in their contents, as well as the minimum weight compulsorily fixed for each denomination, are specified in the following table :—

Denomination of Measure.	Internal Dimensions.		Errors tolerated in their Contents.	Minimum Weight of Measures.		
	Height.	Diameter.		Without Handles or Covers.	With Handles, but without Covers.	With Handles and Covers.
	Millim.	Millim.	Gram.	Gram.	Gram.	Gram.
Double litre - -	216·7	108·4	3·	1,350	1,700	2,200
Litre - -	172·	86·	2·	900	1,100	1,350
Demi-litre - -	136·6	68·3	1·5	525	650	820
Double décilitre -	100·6	50·3	1·	280	335	420
Décilitre - -	79·9	39·9	0·6	145	180	240
Demi-décilitre -	63·4	31·7	0·4	85	110	140
Double centilitre -	46·7	23·4	0·3	45	60	85
Centilitre - -	37·1	18·5	0·2	25	35	50

The errors tolerated in their contents are expressed in grams, or fractions of a gram, because the contents of these measures are regulated by weight. The litre ought to contain a cubic décimètre of distilled water, the weight of which is a kilogram.

These errors can only be tolerated when in excess ; every measure which is too small is inadmissible.

Manufacturers should be careful to make their measures heavier than the minimum fixed, as vérificateurs are to reject all that weigh less.

In spite of the improvements carried out during several years in the mode of constructing pewter measures, consequent on the extension of this branch of industry, it is thought useful to recite herein-after the different points to which manufacturers should direct their attention.

Construction of moulds for pewter measures.

These pewter measures are made by means of moulds used for the purpose. The mould, made of brass, should be so constructed that the body of the measure can be made in one piece, that it be free from blemish, and of the requisite dimensions, and that the upper edge be cleanly finished.

When a manufacturer has constructed a mould, he ought not to use it for making measures until it has been properly verified, and that he has satisfied himself, by many trials, that the measures cast from it are accurate. The most satisfactory method is to cast some measures and take them to the vérificateur to be verified, who will then indicate any corrections either of excess or deficiency that should be made.

It is by such a process that many of the pewterers in Paris, by the aid of the vérificateurs of weights and measures, have succeeded in constructing moulds of almost perfect accuracy.

Standard metal for measures.

The measures must not be made of pure tin ; an alloy of lead is generally added. Too much lead, however, would not only alter the quality of the metal, but would at the same time become injurious to health. This consideration determined the Government to fix the quantity of lead allowed to enter into the composition of the metal destined for the construction of the measures at 16½ per cent., with an allowance of error of 1½ per cent. in excess ; so that the quantity of alloy is never to exceed 18 per cent., in other words, the metal used for making these measures must not contain less than 82 per cent. of pure tin. Those measures made of metal containing less than 82 per cent. of pure tin are of too low a standard, and cannot be admitted.

If pewterers could use only pure tin and lead, the process of making the requisite metal would be simple enough ; they would only have to mix 83½ parts of pure tin with 16½ parts of lead, and they would always have a metal of the fixed standard.

But the tin used in commerce is seldom pure, and what is called *old tin* (*vieux étain*) is always alloyed more or less with lead. Before using such materials, pewterers should first proceed to ascertain their exact quality.

Method determining the quality of the metal.

The means hitherto used by pewterers to ascertain the quality of the materials used by them have been so uncertain that the most experienced persons in their business have often disagreed among themselves as to the degree of purity of the materials tested by them. The establishment of the Metric system will have further contributed to the improvement of this

* See regulations for allowing also tin plate, 27 Nov. 1856, 25 May 1856, &c.

useful art, as it has given rise to endeavours to discover a more satisfactory process for ascertaining correctly the true quality of pewter, that is to say, how much alloy is contained in a given mass of this metal.

Physics and chemistry both afford different methods of arriving at this result; but it is necessary to choose a method both simple and easy which does not involve the necessity of altering the measure. The following mode has consequently been preferred:—

It consists in weighing, first in air, and then in water, the piece of metal to be tested. The weight in air is to be compared with the weight in water, and the weight in air is to be divided by the difference. The quotient shows how much any quantity of the metal in question weighs in comparison with the same volume of water, and this is called the specific gravity of the metal.

Supposing a piece of metal weighs in air 2,352 grammes, and then, when weighed in water, is found to weigh only 2,058 grammes. Taking 2,058 from 2,352, there remains 294. This is the difference between the weight in air and the weight in water. Dividing 2,352 by 294, the quotient is 8. This is the specific gravity of the metal; that is to say, it weighs eight times as much as a quantity of water of the same volume.

It has thus been proved by similar experiments that the weight of pure tin is to that of distilled water as 7·305 is to 1; in other words, that a given mass of pure tin weighs 7·305 times as much as a quantity of distilled water of the same volume; and that the weight of lead is to that of water as 11·299 is to 1; in other words, that a mass of lead weighs 11·299 times as much as a quantity of water of the same volume; so that the weight of a cubic décimètre of water being a kilogramme, or 1,000 grammes, that of a cubic décimètre of tin will be 7,305 grammes, and that of a cubic décimètre of lead 11,299 grammes.

It is evident that the more lead is contained in a mass of tin, the more its specific gravity is increased and approaches that of lead.*

This is the principle, upon which a table has been constructed, after experiments most carefully made, which gives the specific gravity of pewter, according to the quantity per cent. of lead alloy contained in it.

For example, it may be seen in the table that a mass of metal containing 8 parts of lead and 92 parts of pure tin has a specific gravity of 7·496, that is to say, it weighs 7·496 times as much as the same volume of water; and that a metal containing 76 parts of lead and 24 parts of pure tin has a specific gravity of 9·838, that is to say, it weighs 9·838 times as much as the same volume of water.

By means of this table, it may easily be ascertained how much lead is contained in a mass of pewter, the specific gravity of which has been found.

Supposing that the specific gravity of a piece of metal is 7·729, this number must be sought for in the column of specific gravities, or the number nearest approaching it, which is 7·734. It will be seen that the corresponding numbers in the two next columns are 83 and 17; the conclusion is that the piece of metal contains very nearly 83 parts of fine tin and 17 parts of lead, and that its standard is 83 per cent. of fine metal.

When a manufacturer has ascertained the quality of the materials that he purposes to use, he has still an important calculation to make, that of determining the proportion in which they are to be mixed, to constitute pewter of the fixed standard.

Supposing that he may have two descriptions of metal, one 90 per cent. of pure tin, the other 67, and that he wants to know how much of each he should take to constitute pewter having 83 per cent. of pure tin.

He will write down these figures as follows:—

$$83 \begin{cases} 90 - 16 \\ 67 - 7 \end{cases}$$

$$23$$

He is to take the difference between 83 and 90, which is 7, and write it down opposite to 67; and to take the difference between 67 and 83, which is 16, and write it down opposite to 90.

These two new numbers show the quantities of the two metals to be taken, viz., 16 parts of the metal having 90 per cent. of pure tin, and 7 parts of the metal with 67 per cent. The pewter made of these proportions will be of the standard of 83 per cent. of pure tin.

Having thus ascertained that he must take 16 parts of the metal of 90 per cent., and 7 of the metal of 67 per cent. of pure tin, suppose that he wants to know how much of each he should take to make a mass of the specified weight, for example, of 75 kilogrammes, or 75,000 grammes.

He must begin by adding the two amounts 16 and 7 together, making 23. He will then proceed with the rule of three sums, viz.:

$$\text{As } 23 : 75{,}000 :: \begin{cases} 16 : 52{,}174 \\ 7 : 22{,}826 \end{cases}$$

The result being that he must take 52,174 grammes of the metal with 90 per cent. fine, and 22,826 parts of the metal with 67 per cent. fine, and he will have 75,000 grammes or 75 kilogrammes of pewter with 83 per cent. of pure tin.

By a similar process, pewterers having a quantity of metal of ascertained fineness, and wishing to bring it to the requisite fineness of 83 per cent., may learn how much either of pure tin or of lead it may be necessary to add. (Several examples are here given in the instructions in order that the process may be better understood.)

Mode of construction of the measures.

Having thus shown the method of constructing the moulds, and of ascertaining the standard fineness of the metal to be used, as well as the composition of the alloys, it remains only, so far as relates to the manufacture of the measures, to refer the manufacturers to the models deposited at the bureaux de vérification, and to the trade regulations, as to the making of the metal, the casting of the measures, their extraction from the mould, their being finished in the lathe, the addition of the spout, handle, and cover.

But the manufacturers should be cautioned to stir the melted metal well, every time that they are going to pour it into the mould; else the lead being heavier than the tin, will remain at the bottom of the melting pot, and the measures last made will be of inferior metal to those made first.

They should also pay attention to maintaining the metal for casting at a constant degree of heat, so as to avoid bubbles and other defects occasioned by an excess or deficiency of heat.

The cylinder which forms the core of the mould being very difficult to withdraw from large measures, it is convenient that the instrument used for the purpose be made so as to turn a little, that the disengagement of the cylinder may be made more easy.

It is expedient also that there should be a small hole in the middle of the bottom of the measure, to give air, without which much more difficulty would be experienced in withdrawing the cylinder; the bottom would also bulge in, and the capacity of the measure be diminished. The hole can easily be filled afterwards with solder.

Inscription of their names, &c., on the measures.

Measures with handles, handles and covers, or without handles, should have their denomination legibly inscribed upon them, about $\frac{3}{16}$ths of their whole height taken from their upper rim.

The name or mark of the maker must be stamped or engraved on the bottom of the measure; the precaution must be taken to support the bottom, to prevent its being indented during the operation.

* It is by weight alone that the proportions of alloy are regulated: A combination of metals based upon their volumes would be improper, and would afford no means of ascertaining the proportions of their component parts.

Conditions for admitting the measures to verification.

Measures presented for verification by the makers are not to be received if they have one or more of the following defects:—

1. If the pewter measures are not of the prescribed standard, that is to say, if they contain more than 18 per cent. of alloy, or less than 82 centimes fine.

2. If they have not the minimum weight fixed for each denomination of measures.

3. If the due internal dimensions are not exactly observed.

4. If they contain less than the requisite quantity, or their contents exceed the amount of error tolerated in excess.

5. If the measures leak.

6. If they have any air-bubbles, cavities, or other evident defects.

7. If the surface inside, or the brim, has been altered by the workman's tool, or if the face left by the casting is not plainly seen.

8. If the measures do not bear their denomination, and the mark of the maker.

Part II.

Construction of Measures for Milk.

Construction, &c. of milk measures.

Measures for milk are to be constructed of tin plate.* Their form is that of a cylinder, of which the internal height is equal to the diameter, in accordance with the regulations prescribed for grain measures.

The denominations of these measures, their dimensions, and the errors to be tolerated in their adjustment, are shown in the following table:—

Denominations.	Height and diameter.	Error tolerated.
	Millimètres.	Grammes.
Double litre - - -	136·6	4·
Litre - - - -	108·4	3·
Demi-litre - - -	86·	2·
Double décilitre - -	63·4	1·5
Décilitre - - -	50·3	1·
Demi-décilitre - -	39·9	0·6

Every measure is to be constructed,—

1. With the body made of a single plate of metal, except the double litre, to which a band firmly soldered may be added.

2. With a bottom which must also be made of one piece, and the diameter exceeding by 6 millimètres that of the body of the measure, in order that it may be joined on by overlapping the circumference. At one spot where the bottom is thus joined to the body a bit of flat tin is to be fixed to receive the impression of the stamp. A similar bit is to be fixed near the upper rim ready to receive the stamp of the year's letter.

3. The body of every measure is to be hammered over at the upper part so as to form a rim or border of sufficient depth to enable the proper denomination to be legibly inscribed upon it.

All the measures should have a handle formed of a band of tin plate about 2 centimètres in width, the edges of which are to be hammered round. For the litre and double litre this handle is to be in the form of a square oblong; one end is to be fixed to the top of the measure, the other two or three centimètres above the bottom. In the other measures the handle is to form a kind of hook, rising about 7 centimètres above the measure.

Conditions for admitting milk measures to verification.

The makers are to take notice that measures presented for verification will be rejected,—

1. If they are not made of tin plate.

2. If the proper internal dimensions of the measures are not strictly observed.

3. If they contain less than the requisite quantity, or in excess of the errors tolerated.

4. If the measures leak.

5. If, besides the other causes of rejection generally applicable to liquid measures, there has been an omission to melt two bits of pewter, one upon the upper rim, and the other upon the junction of the bottom with the body of the measure.

6. If the measure do not bear the denomination, and the mark of the maker.

* Sheet iron, with a tinned surface, allowed by Circular, 16 Nov. 1861. See p. 83.

No. 6.—Instructions for Verifying Liquid Measures of Capacity.

6. Verificat of liquid measures capacity

Part I.

For Liquids generally.

[*These Instructions begin by reciting the regulations for the denominations of the several measures, their construction and the standard pewter of which they are to be made, as already set forth in* No. 5.]

Apparat for verif the stan of the pewter.

There must be a balance of sufficient sensibility, capable of bearing about 2 kilograms in each scale.

This balance, supported on an iron pedestal, is to be placed upon a table specially appropriated for the process, on which is to be placed a cylindrical vessel or tub, made of tin plate, and of sufficient size to have the largest measures placed in it without touching the sides. For this purpose it is to be placed immediately under one of the ends of the beam of the balance.

One of the pans of the balance is to be suspended from the end of the beam, as usual, at a little distance from the table; but the other end of the beam on the right-hand side is to carry two pans, one for weighing the measure in air, which should hang sufficiently high above the cylindrical vessel not to touch the water contained in it; the other pan is to be made of brass wire plaited, or of a perforated plate, and to be suspended by three brass chains attached to the edge of the upper pan. This second pan is intended to hold the measure after it has been weighed in air, and it is wished to weigh it in the water, with which the vessel or tub should be nearly filled, and in which the second pan should always remain immersed.

The water to be used for the process should be distilled water, if possible, else river water, or rain water well filtered.

Very accurate weights, down to the half centigram, should also be provided.

The results of the several weighings are to be written down in a note book.

Method verifica

Everything being arranged as already stated, the pewter measure to be verified is placed in the upper pan, and bits of lead or other metal are placed in the other pan as a counterpoise.

When an equilibrium is established, the measure is to be removed from the pan, and weights substituted, the sum of which is equal to the weight in air of the measure. This weight may be called A.

The measure is then to be dropped into the water contained in the cylindrical vessel, and placed in the pan immersed in it, so that it is entirely under water.

The weights must then be removed from the upper pan, where they are no longer required, except that those may remain which re-established an equilibrium, and which will show the weight which the measure has lost in water, to be called P.

It must then be ascertained what relation the weight P, which the measure has lost from being weighed in water, bears to the weight A, its weight in air. It has been found that pewter containing 82 per cent. of tin, loses when weighed in water 0·1288 of its weight, as compared with its weight in air. If, therefore, P exceeds 0·1288 A, or simply 0·129 A, the standard is good; if P is less, the standard is bad, and the measure containing less than 82 per cent. of fine metal must be rejected.

Mode of ascertain the rati the weig lost in w to the we in air.

The most direct means of immediately ascertaining what proportion of the weight in air corresponds with the weight lost in water, would be to divide this

last amount by the first; that is to say, to divide P by A.

Supposing that a measure was found to weigh in air 2472·32 grams, and that weighed in water it lost 318·95 grams, this last number should be divided by the first, and the quotient being found to be 0·129, the result would be that the metal of the measure was according to the standard.

However simple this operation may be, it has been considered right to lessen the work of the vérificateurs, and for this purpose the following table has been prepared, which reduces all calculations of the kind to simple addition. The first column contains different weights in whole numbers. In the second will be found the amount of weight that each should lose in water, so that it may at once be seen that for any unit of weight a mass of pewter should lose 129 out of 1,000 parts; that is to say, for 1 kilogram, 129 grams; for 1 hectogram, 129 décigrams, &c.; a weight of two of such units should lose 258 out of 1,000 parts; that is to say, for 2 kilograms, 258 grams, &c.

TABLE for ascertaining how much Pewter should lose, when weighed in water, of its weight in air, its standard being 82 per cent. fine metal:—

Weight in Air.	Loss in Water.	Weight in Air.	Loss in Water.	Weight in Air.	Loss in Water.
1	0·129	200	25·757	30,000	3,863·49
2	0·258	300	38·635	40,000	5,121·32
3	0·387	400	51·513	50,000	6,439·15
4	0·515	500	64·392	60,000	7,726·98
5	0·644	600	77·270	70,000	9,014·81
6	0·773	700	90·148	80,000	10,302·64
7	0·901	800	103·026	90,000	11,590·47
8	1·030	900	115·905	100,000	12,878·3
9	1·159	1,000	128·783	200,000	25,756·6
10	1·288	2,000	257·566	300,000	38,634·9
20	2·576	3,000	386·349	400,000	51,513·2
30	3·863	4,000	515·132	500,000	64,391·5
40	5·151	5,000	643·915	600,000	77,269·8
50	6·439	6,000	772·698	700,000	90,148·1
60	7·727	7,000	901·481	800,000	103,026·4
70	9·015	8,000	1,030·264	900,000	115,904·7
80	10·303	9,000	1,159·047	1,000,000	128,783·0
90	11·590	10,000	1,287·83		
100	12·878	20,000	2,575·66		

The use of this table is very simple, as may be seen from the following example:

EXAMPLE.

The weight of a pewter measure in air being found to be 7,325 grams, there should be taken from the table,

For	7,000	grams	901·481
„	300	„	38·635
„	20	„	2·576
„	5	„	0·644
By addition, for	7,325	„	943·336

This ought to be the amount of weight that the measure should lose when weighed in water. If it loses more, the pewter will contain more than 82 per cent. of fine metal; if it loses less, it will prove that the pewter does not contain a sufficient quantity of fine metal, and the measure must be rejected.

The measure should, therefore, be put into the water, and the weights counted which remain in the pan; if, for instance, these weights amount to 943·4, or 943·6 grams, being in excess of 943·336, the standard is to be judged good; if the loss of weight is only 943·2, the standard is to be deemed bad.

If several measures are to be verified which have been delivered at one time by one manufacturer, as it is to be presumed that all have been constructed from the same metal, the vérificateur may content himself with taking two or three at random for the whole number, and if he find no variation in the standard, he may at once proceed to the verification of their contents.

When any new measures are issued, the apparatus to be used for their verification will now be described.

As it may probably be difficult to procure these measuring *carafes*, which have been kept only in few bureaux, in such cases vérificateurs must use analogous means to those herein-after stated.

The *carafes*, or bottles of clear glass, are to have long necks, their internal diameter not exceeding 2 centimètres for those of the largest size, and 1 centimètre for the lesser, which may be very small medicine phials.

The size of the carafes should be in proportion to the measures to be verified, so that water contained in the measure, when poured out of it, should reach to about the middle of the neck.

Before these measuring carafes, which are called *vérificatoires*, can be used, they must first be adjusted, which is to be done as follows:—

The standard measure corresponding with the *vérificatoire* is to be filled with water a little over the brim. The feather of a quill is then introduced into the water and passed along the sides of the standard measure, to detach any air bubbles which may adhere to them.

A disc of glass* is then to be passed over the measure. The water thrown off by the disc can be wiped up with a damp sponge, and by means of a funnel all the water in the measure is to be poured into the *vérificatoire*.

Any portion of water remaining in the standard measure, or on the surface of the disc, is to be taken up with a damp sponge which has been well wrung, and is to be squeezed also into the funnel; and when every drop has passed through the funnel, the height to which the water reaches in the neck of the carafe

* Every standard measure should have its corresponding disc, which may be used also in verifying measures of the same denomination. This disc is a piece of circular plate-glass of the size of the external diameter of the measure.

is to be marked either with a fine file or with either black or red colour ground with oil and varnish. To this mark, at least, the contents of every measure submitted for verification should reach.

It remains now to specify how much higher it is allowable that the contents should extend, that is to say, to fix the limits of tolerance.

This allowance of error is fixed by the regulation herein-after made at 3 grammes weight of water for the double litre, and so on in proportion. It is necessary, therefore, to provide the means of adding the exact quantity of 3 grams weight of water into the double litre, and other proportionate quantity into lesser measures. These means are as follows :—

Take a glass tube of from 6 to 8 millimètres in diameter, open at one end, and the other end narrowed nearly to a point.

The small end is to be temporarily closed with a bit of soft wax, and the tube placed in the pan of a balance, and kept in nearly a vertical position by a thread fastened to the chains.

A counterpoise being placed in the opposite pan, as soon as an equilibrium is established, a demi-gram weight is to be placed in the opposite pan.

A small syringe full of water is then to be taken, with which the water is to be introduced, drop by drop, into the tube, until the equilibrium is re-established. The tube must then be removed from the pan, and a mark made with a fine file where the water has now reached.

The tube is then to be replaced in the pan, another demi-gram put into the opposite pan, and more water introduced into the tube to restore the equilibrium.

A gram weight of water will then have been added, and the height is again to be marked. The same process is to be repeated until the height of 3 grams weight of water is marked ; after which the space between each mark should be divided into five parts, each representing a décigram. The demi-grams should be distinguished by longer lines and the grams by still longer lines.

When this instrument is thus prepared, it may be used for adding gram weights of water or smaller quantities to the *vérificatoire*. It is used in the same way as a burette, or pipette (*champlure*). It is immersed open in water up to the line which marks the quantity of water required ; the upper orifice is then closed with the finger, and the requisite quantity of water can then be taken up, which may be added to that in the *vérificatoire*, by raising the finger to let the water fall.

By this method three grams weight of water can be introduced into the *vérificatoire* for the double litre, 2 grams weight into that for the litre, &c. The height to which the water reaches after this addition is to be marked and shows the maximum of tolerance; and thus means are afforded for verifying any measures which may be presented for verification.

Method of verifying the capacity of measures by means of this apparatus.

The process of verifying the capacity of measures by means of this apparatus is to be conducted as already stated in describing the requisite instruments.

If the water in the *vérificatoire* does not reach the first mark the measure is too small; if it reaches above the second mark the measure is too large ; the measure is admissible if the water reaches between the two marks

When many pewter measures are presented at one time by one manufacturer, as it is presumable that all the measures have been made from the same moulds, the vérificateur may dispense with verifying all of them. He will merely take at random some of each denomination. But he ought to verify the height and diameter of all, in order to be satisfied that there are no measures which are too small that have been placed among them.

Other methods where there is no vérificatoire.

When there is no *vérificatoire* at hand, other processes for accurately determining the capacity of liquid measures will next be described.

Supposing that a litre measure is to be verified ; pour pure water into the standard litre until it rises a little above the brim ; pass a feather of a quill along the inner surface to expel any air bubbles that may be attached ; pass a disc of unpolished glass over the edge of the standard measure ; take up with a sponge all the water thrown off by the disc ; take off the disc and let it drain into the litre measure to be verified, into which transfer also all the water contained in the standard, and expel any air bubbles that may adhere to the inner surface of the measure ; then pass the disc over the measure, letting it glide gently along the edge.

Several different results may happen :—

1. When the disc throws off a little water, the measure being quite full, it is a proof that the litre is too small, and should consequently be rejected, in accordance with the regulations.

2. When one or two air bubbles are seen under the disc, which occurs whenever the litre is a little too large, a very little of the water from the tube described as a vérificatoire is to be taken up with a small syringe, the disc is to be slid along so as to uncover a vacant part of the interior of the measure, the water is to be injected from the syringe, and the disc replaced ; the same process is to be repeated, if necessary, until all the air bubbles disappear, when the syringe is to be re-emptied into the tube. The difference of height of water in the tube shows how much the litre is too large.

3. When no air bubble is seen under the disc, nor any water thrown off by the disc, it must then be assumed that the measure is evidently in excess, and to be satisfied of this the disc should be removed. If it is not wet over the whole of its surface, it is a proof that the water has not reached the brim of the measure. The process described under the preceding head will then serve to ascertain the quantity that the measure is in excess.

4. Finally, when no air bubble is seen, and when the part of the disc which has been slid over is wet ; or if by withdrawing the disc a little the water is found to be everywhere in contact with its under surface, it is a proof that the measure is exact.

In the second and third hypotheses thus stated, the tube which the vérificateurs can either procure or make for themselves will always serve to indicate the amount of error in the contents of the litre submitted for verification.

The same method may be used for verifying all measures the standards of which are deposited in the bureaux de vérification. In case of need, a volume equal to that of the measure under comparison may be formed by filling as often as requisite the standard measures which vérificateurs may have at their disposal, that is to say, five litres for the dékalitre, two double dékalitres and a dékalitre for the demi-hectolitre, and five double dékalitres for the hectolitre.

Liquid measures of capacity may also be verified by the weight of the water they contain. This weight, as well as the tolerated difference in excess of their contents, for the measures of the double litre and under, is specified in the table annexed to the regulation. As for the larger measures, from the demi-dékalitre up to the hectolitre, which should be constructed of brass, or sheet or cast iron, and should agree with the dimensions specified in regard to the same measures for dry goods, the error to be allowed in excess is fixed at the same amount as for the last-mentioned measures, viz., at $\frac{1}{500}$th of their contents.

Precautions to be taken in verifying the standard metal, and the capacity of the measures.

The following precautions should be taken in verifying the standard metal, and the capacity of the measures.

It should be particularly attended to that no air bubble adheres to the measure when it is weighed in water. For this object it will be well to pass a feather along its sides, both inside and out, to remove the air.

Before making any weighings, either in air or water, the balance should be first carefully examined to see that it is in good condition, and that nothing impedes its action for effecting the operation just

described. It is of little consequence that the balance should be in equilibrium, this may be readily effected by counterpoising.

As the rubbing of the measure against the sides of the vessel in which it is weighed might cause considerable error, this should be carefully guarded against.

The water of the vessel in which the weighings are made should be frequently renewed. It should also be particularly looked to that it contains no foreign matter, especially saline substances, which would increase its density. When not used, the vessel should always remain covered up; but for greater security an areometer should be provided, to be immersed in the water before beginning the process, in order to ascertain that there is no variation of density.

Changes of temperature produce also differences in the results which ought to be taken into account, remembering that in cold weather the standard of the metal will appear better than in hot weather, because the metal loses more of its weight in cold weather than in hot. The preceding table has been framed on the supposition that the observations will always be made at a temperature from 12° to 15° Reaumer.

In verifying the capacity of measures care should also be taken that no air remains in the measure. It is equally essential that no water remains either in the *vérificatoire* or in the standard; it is, however, of importance that their sides are free from air and even be a little damp. Before the operation, therefore, a little water may be poured in them, and they should then be well drained.

The water poured into the vérificatoire or the standard through a funnel should also have time to drain.

Method of determining the quantity of lead contained in pewter.

In this instruction the means have already been pointed out for determining if the pewter of which the measure is made does not contain less than 82 per cent. of fine metal. The functions of the vérificateurs are limited to this determination. It may, however, happen that some of them may be consulted by manufacturers for information as to making this standard metal, and as to the description of the metals to be used, as well as the proportions of each metal to be mixed together so as to make pewter containing more than 82 per cent. of fine metal. It has been thought necessary to add an explanation of the method to be pursued for this object.

(Similar directions here follow as are contained in No. 5, p. 58.) The following table shows the specific gravity of pewter composed of different proportions per cent. of pure tin and lead:—

TABLE OF SPECIFIC GRAVITY OF PEWTER, ACCORDING TO THE SEVERAL PROPORTIONS PER CENT. OF PURE TIN AND LEAD CONTAINED IN IT.

Specific Gravity.	Proportions per Cent.		Specific Gravity.	Proportions per Cent.		Specific Gravity.	Proportions per Cent.	
	Of Tin.	Of Lead.		Of Tin.	Of Lead.		Of Tin.	Of Lead.
7·305	100	0	8·259	66	34	9·510	32	68
7·328	99	1	8·292	65	35	9·551	31	69
7·352	98	2	8·326	64	36	9·592	30	70
7·375	97	3	8·359	63	37	9·632	29	71
7·399	96	4	8·393	62	38	9·672	28	72
7·422	95	5	8·426	61	39	9·713	27	73
7·447	94	6	8·460	60	40	9·753	26	74
7·472	93	7	8·494	59	41	9·793	25	75
7·496	92	8	8·528	58	42	9·838	24	76
7·521	91	9	8·562	57	43	9·883	23	77
7·546	90	10	8·596	56	44	9·928	22	78
7·573	89	11	8·630	55	45	9·973	21	79
7·597	88	12	8·668	54	46	10·018	20	80
7·620	87	13	8·706	53	47	10·066	19	81
7·649	86	14	8·743	52	48	10·113	18	82
7·678	85	15	8·781	51	49	10·161	17	83
7·708	84	16	8·819	50	50	10·208	16	84
7·734	83	17	8·854	49	51	10·256	15	85
7·765	82	18	8·889	48	52	10·315	14	86
7·790	81	19	8·925	47	53	10·373	13	87
7·817	80	20	8·960	46	54	10·432	12	88
7·848	79	21	8·995	45	55	10·490	11	89
7·879	78	22	9·033	44	56	10·549	10	90
7·910	77	23	9·072	43	57	10·617	9	91
7·941	76	24	9·110	42	58	10·685	8	92
7·972	75	25	9·149	41	59	10·754	7	93
8·003	74	26	9·187	40	60	10·822	6	94
8·034	73	27	9·227	39	61	10·890	5	95
8·064	72	28	9·267	38	62	10·972	4	96
8·095	71	29	9·307	37	63	11·054	3	97
8·126	70	30	9·347	36	64	11·135	2	98
8·159	69	31	9·387	35	65	11·217	1	99
8·192	68	32	9·428	34	66	11·299	0	100
8·226	67	33	9·469	33	67			

The general regulations for the verification of liquid measures of capacity are—

I. The internal dimensions of the pewter measures, the weight of water contained in them, the errors tolerated, and the minimum weight of each denomination of measures, are specified in the following table:

Names of Measures.	Internal Dimensions.		Weight of Water contained in the Measure.	Errors tolerated in their Contents.	Minimum Weight of Measures.		
	Height.	Diameter.			Without Handles or Covers.	With Handles and without Covers.	With Handles and Covers.
	Millim.	Millim.	Gram.	Gram.	Gram.	Gram.	Gram.
Double litre - -	216·7	108·4	2,000	3·	1,350	1,700	2,200
Litre - - -	172·	86·	1,000	2·	900	1,100	1,350
Demi-litre - -	136·6	68·3	500	1·5	525	650	820
Double décilitre -	100·6	50·3	200	1·	280	335	420
Décilitre - -	79·9	39·9	100	0·6	145	180	240
Demi-décilitre -	63·4	31·7	50	0·4	85	110	140
Double centilitre -	46·7	23·4	20	0·3	45	60	85
Centilitre - -	37·1	18·5	10	0·2	25	35	50

II. The specified errors are only tolerated in excess.

III. The measures are not to be of less weight than the minimum specified for each denomination; if of less weight they are inadmissible.

IV. In addition to the requisite accuracy, no measure is to be admitted for verification having one or more of the following defects:

1. If the standard of the pewter is less than 82 per cent. fine, that is to say, if it contains more than 18 per cent. of lead;

2. If any flaw is observable on the inner or outer surface of the pewter;

3. If it does not hold exactly the requisite quantity of water;

4. If any change has been made in its inner surface, including the upper rim as it comes from the mould, that is to say, in the dull tint constantly seen on the surface of all castings, when no kind of work has been bestowed upon them;

5. If it has any indentation, or evident defect;

6. Lastly, if the maker has neglected to inscribe his mark, as well as the name of the measure.

V. When the measures have only slight defects, capable of being corrected, the vérificateurs should return them to the makers in the same state as when delivered to them; but if these defects are of such a character that they cannot be rectified, the vérificateurs should deface the measures so that they must be re-cast.

Part 2.—*Verification of Measures for Milk.*

Verification of measures for milk.

The form and dimensions directed for dry measures are applicable to measures exclusively intended for milk; these are the litre and décilitre, and the double and half of each.

They should be made of tin plate, in the form of a cylinder with the internal height equal to the diameter.

The body of these measures should be hammered over at the upper part, and form a rim sufficiently wide to bear its proper name legibly inscribed on the part opposite the handle or hook with which these measures should be provided.

They should also have upon them two bits of pewter, one on the upper edge, the other on the junction of the bottom with the body of the measure, to receive the impressions of the stamps.

Regulations for verifying measures for milk.

The regulations for the verification of measures for milk are,

I. The internal dimensions of the measures, and the errors tolerated in their contents, are specified in the following table:—

Names of Measures.	Height and Diameter.	Errors tolerated.
	Millimètres.	Grammes.
Double litre - -	136·6	4·
Litre - -	108·4	3·
Demi-litre - -	86·	2·
Double décilitre - -	63·4	1·5
Décilitre - - -	50·3	1·
Demi-décilitre - -	39·9	0·6

II. These errors are tolerated only when in excess.

III. Besides the other causes of rejections specified for liquid measures generally, and which are also applicable to tin-plate measures, no measure is to be admitted having the following defects:—

1. If it has not at its upper edge a rim rounded above and below, and fixed to the body of the measure on a level with the edge, and if the maker has neglected to melt two bits of pewter, one on the rim, and one on the junction of the bottom with the body of the measure;

2. If it does not bear its proper name, as well as the name of the maker.

(*See also p. 75, Supplementary Instructions relating to tin-plate measures which may be used in the retail sale of oil.*)

No. 7.—Instructions for Constructing Cast-Iron Weights.

Con tion iron

Mo stru

The weights must be constructed of cast iron.

A complete set of cast-iron weights, for trade use, begins with 50 kilograms and ends with the demi-hectogram.

Weights of all kinds of forms are not allowed; those to be adopted are herein-after specified.

Iron weights of 50 and 20 kilograms should be constructed in the form of a truncated pyramid, rounded at the angles, and having for the base a parallelogram.

The other iron weights, from 10 kilograms to a demi-hectogram inclusive, should be in the form of a truncated pyramid, having for the base a regular hexagon.

Each weight is to be formed of three distinct parts; the body, staple, and ring.

The body of the weight is a mass of cast iron having the external form of a quadrangular or hexagonal truncated pyramid, according to the series to which it belongs; it has a rectangular cavity the variable dimensions of which are determined by the specific gravity of the metal used, and by the quantity of lead required to adjust the weight.*

As to its upper surface, it should bear in relief, and over the ring, the abbreviated denomination showing its weight; a circular groove should be made on the opposite side to receive the ring, which should not pass the edge of the weight.

In the centre on the same surface, there should be an aperture to receive the staple communicating with the cavity at the bottom by means of a square hole, care being taken to regulate the thickness of the staple, so that the ring lays the whole of its length in the groove.

The body of the weight should in other respects be clean and smooth, and have neither flaw nor blister liable to break, and show no hole or cavity into which it may be possible to pour melted lead or other matter.

The rings should be of soft iron, round, and welded hot; they should have, besides, sufficient play in the

* See changes authorized by Circular of 1 Feb. 1868, p. 82.

staple, and should easily enter the circular grooves intended to receive them.

The staples should be of soft iron, forged, and of more strength in the part which holds the ring than at their ends, which being tapered will be more easily bent round in the inner cavity of the weight. They should, in addition, be fastened in with the requisite quantity of lead, not only for adjusting the weight, but also for receiving the impressions of the stamps of verification and of the name of the maker.

The names of the weights, the abbreviated denominations to be inscribed on the upper surface of each, as well as their principal dimensions, and the errors tolerated, are shown in the following table:

Table of names, dimension errors to rated, &c

RECTANGULAR FORM.

Names of Weights.	Abbreviation marked on the upper surface.	Errors tolerated.	Height or thickness.	Base.		Upper surface.		Ring.	
				Length.	Width.	Length.	Width.	Internal diameter.	Thickness of the Iron.
		Grams.	Millim.	Millim.	Millim.	Millim.	Millim.	Millim.	Millim.
50 kilograms -	50 kilog. -	20·	136	318	210	288	181	8	20
20 kilograms -	20 kilog. -	10·	100	245	157	221	133	6	11

HEXAGONAL FORM.

Names of Weights.	Abbreviation marked on the upper surface.	Errors tolerated.	Height or thickness.	Radius on side of hexagon.		Ring.	
				Base.	Upper surface.	Internal diameter.	Thickness of Iron.
		Grammes.	Millim.	Millim.	Millim.	Millim.	Millim.
10 kilograms - -	10 kilog. - - -	6·	82	89	82	63	10
5 kilograms - -	5 kilog. - - -	4·	66	72	66	55	8
Double kilogram -	2 kilog. - - -	2·	48	53	48	39	6
Kilogram - - -	1 kilog. - - -	1·	39	42	39	31	5
Demi-kilogram -	Demi-kilog. / 5 hectog. - - -	0·5	31	34	31	24	4
Double hectogram -	2 hectog. - -	0·3	23	26	23	18	3
Hectogram - -	1 hectog. - -	0·2	18	20	18	15	2·5
Demi-hectogram -	Demi-hectog. - -	0·1	14	15·5	14	12	2

Conditions for admitting these weights to verification.

These weights are not to be admitted for verification if they have one or more of the following defects:

1. If they are not made of cast iron;
2. If their principal dimensions sensibly differ from those specified in the above tables;
3. If the casting is brittle or has any blister or flaw, or other imperfection;
4. If the denominations of the weights are not in conformity with the directions prescribed in the above tables, or if they are not legible;
5. If the rings are only brazed or merely rounded together without being welded;
6. If they pass beyond the edge of the weight, or are not sufficiently strong, or do not move easily in their staples;
7. If the staples are not made of iron of good quality, and securely fixed;
8. If the lead is not poured in at a single melting, and in sufficient quantity to facilitate the application of the stamps;
9. If the maker has omitted to affix his mark.

8. Construction of brass weights.

No. 8.—INSTRUCTIONS FOR THE CONSTRUCTION OF BRASS WEIGHTS.

PART 1.—*Brass cylindrical Weights, with Knobs.*

Brass cylindrical weights, with knobs.

Brass weights should be made in the form of a cylinder, surmounted with a knob.

The set of brass weights begins at 20 kilograms and ends with a gram.

The height of the cylinder of each weight should be equal to its diameter, and that of the knob should be equal to half the diameter.

The weights of 1 and 2 grams should have the diameter greater than the height, in order to give requisite space for the inscription.

The weights from and including the demi-gram to the milligram are to be made of thin sheet brass cut square.

The cylindrical weights and their knobs are to be made of cast yellow brass. They may be solid, or may contain a certain quantity of lead inside; but they should always be of the same volume These weights may be made in one piece, or of two pieces only, viz., the cylinder and the knob. In this latter case, the knob must be attached by a screw to the upper part of the body of the weight, and permanently fixed by a pin or small screw levelled with the surface. This pin is to be of copper, in order that it may be easily distinguished.

Weights filled with lead should have sufficient thickness to resist the shocks they experience daily. The set of hollow weights must not pass lower than the weight of 200 grammes; those beginning with 100 grammes must be solid.

The names of brass weights, the denominations inscribed upon them, the errors tolerated in their accuracy, and their dimensions, are specified in the following table:

Table of their names dimensions errors to rated, &

Names of Weights.	Denomination to be inscribed on upper surface.	Errors tolerated.	Height and diameter of cylinder.		Height of knob.	Total height of weight.	Diameter of knob.	Diameter of base of knob.	Minimum thickness of cylinder of hollow brass weights.
		Centigr.	Millim.		Millim.	Millim.	Millim.	Millim.	Millim.
20 kilograms	20 kilogrammes	150·	142		71	213	80	96	8
10 kilograms -	10 kilogrammes	80·	114		57	171	60	76	7
5 kilograms -	5 kilogrammes -	50·	90		45	135	46	60	6
Double kilogram -	2 kilogrammes -	25·	66		33	99	34	42	5
Kilogram - -	1 kilogramme -	15·	52		26	78	27	32	4
Demi-kilogram -	500 grammes -	10·	42		21	63	22	27	3·5
Double hectogram -	200 grammes -	5·	32		16	48	16	20	3
Hectogram - -	100 grammes -	3·	25		12·5	37·5	12	15	
Demi-hectogram -	50 grammes -	2·5	20		10	30	9	11	
Double dékagram -	20 gram. - -	2·	14		7	21	6	8	
Dékagram - -	10 gram. - -	1·5	11		5·5	16·5	5	6	
Demi-dékagram -	5 gram. - -	1·	9		4·5	13·5	4	5	
			Diameter.	Height.					
Double gram -	2 gram. - -	0·4	8	4	4	8	3·5	4·5	
Gram - - -	1 gram. - -	0·2	7	2·5	3·5	6	3	4	

		Size of square in Millimétres.
Demigram - -	5 décig. - -	15
Double décigram -	2 décig. - -	12
Décigram - -	1 décig. - -	10
Demi-décigram -	5 C. G. - -	9
Double centigram -	2 C. G. - -	7
Centigram - -	1 C. G. - -	6
Demi-centigram -	5 M. G. - -	5
Double milligram -	2 M. - -	4
Milligram - -	1 M. - -	3·3

The dimensions of the cylinder and height of the knob being essential, manufacturers should deviate from them as little as possible, and should correct differences occasioned by the specific gravity of the metal, which is not always the same, by increasing and diminishing the size of the knob, the height of which should be equal to half the diameter of the cylindrical body.

By altering with a rolling press the thickness of the sheet brass which is to form the subdivisions of the gram, the proper thickness of each of these weights may be found according to the dimensions specified for it.

Conditions of admission for verification.

Brass weights with knobs are not to be admitted for verification if they have one or more of the following defects :

1. If their essential dimensions are not in conformity, or very nearly so, with those prescribed ;
2. If they have not their denominations inscribed in legible characters as prescribed ;
3. If they have any flaws or other imperfections ;
4. If the weights cast in two pieces have not the knob permanently fixed upon the cylinder by means of a pin tapped or riveted flush with the surface ;
5. If their errors are in deficiency, or exceed those tolerated ;
6. Lastly, if the maker has omitted to affix his mark.

(See also fig. 1 and 2 of plate No. V. in the Atlas which is transmitted with the instructions.)

PART 2.—*Brass Weights in the form of conical Cups.*

Construction of brass weights in the form of conical cups.

It is allowed to make brass weights of a kilogram or one of its subdivisions, in the form of conical cups fitting one in another, and thus enclosed in a box which is itself a legal weight.

In order not to expose the public to fraud or error, by using for trade purposes weights which, though equal, yet differ in size, and may easily be mistaken one for the double of the other, it is of importance to make weights of this form in accordance with the existing legal series of subdivisions, in which each smaller weight is not now, as formerly, regularly the half of that which contains it, but must be either the half or two-fifths of it, or else equal to it. Under these circumstances, the Government has thought fit to direct a new model of a kilogram to be constructed with conical cups fitting into it, the weights being so arranged that the two equal weights found in every decimal series are alike in all their dimensions. The result is that the inconveniences hitherto experienced in the construction of decimal weights in the form of conical cups have entirely disappeared.

The construction of weights of this description is consequently subject to conditions which guarantee protection to the public. A new form of weight has been selected differing sufficiently from that of the old weights, so that the new weights can be easily distinguished from them.

The first thing to be done by a manufacturer wishing to undertake the construction of weights with conical cups, is to consult figures 3 and 4 in plate No. V. of the Atlas, which accompanies the instructions. He may also make himself acquainted with the model of the kilogram deposited in every office of verification.

Conditions for admitting the weights to verification.

Weights in the form of conical cups presented for verification are not to be admitted :

1. If they differ from the form and mode of construction specified in figures 3 and 4 of plate No. V. and formally directed for these kinds of weights ;
2. If any are constructed other than those of 1 kilogram, 500 grams, 200 grams, and 100 grams ;
3. If the equal weights, two of which should be found in every decimal series, are not alike in all their dimensions ;
4. If the weights are not solidly made ;
5. If their proper denominations are not legibly

inscribed upon them, not only upon the upper surface of the weights enclosed in the boxes, but also upon the boxes themselves ; and if such denominations are not those prescribed for brass weights with knobs ;

6. If the errors of adjustment are more, either in excess or deficiency, than those tolerated for brass weights ;

7. If the maker has neglected to affix his mark.

9. Verification of cast-iron and brass weights.

No. 9.—Instructions for Verifying Cast-Iron and Brass Weights.

The form of weights is no longer arbitrary.

Weights must be constructed either of cast iron or brass.

As to their form.

The established form of iron weights is that of a truncated pyramid, the base of which is either a parallelogram or a regular hexagon.

The established form of brass weights is that of a cylinder surmounted with a knob.

Brass weights of a kilogram, or one of its parts, may also be constructed in the form of conical cups.

Regulations for verifying iron weights.

The series of iron weights begins with 50 kilograms and ends with the demi-hectogram. The regulations for their verification are as follows :—

I. The several iron weights, their abbreviated denomination to be inscribed upon each, and the errors to be tolerated in their verification, are those specified in the table, p. 65, of the instructions for constructing these weights.

II. The errors so specified are only to be tolerated when in excess.

III. Weights of 50 and 20 kilograms must be made in the form of a truncated pyramid, rounded at the angles and having for the base a parallelogram.

IV. Weights from 10 kilograms to the demi-hectogram must be in the form of a truncated pyramid, having for the base a regular hexagon.

V. The dimensions of iron weights must be in conformity, or nearly so, with those specified in the table, p. 65, relating to the construction of these weights.

VI. Those weights only are to be admitted for verification which fulfil the following conditions :

1. That the ring be of wrought iron, round, and welded hot, and having sufficient play in the staple ; that, in addition, it falls easily into the groove made to receive it, and does not pass the edge of the weight.

2. That the staple be made of wrought iron and of sufficient strength, not only at the top which holds the ring, but also to its very ends, which should be bent round underneath in order easily to retain the lead required for the adjustment of the weight ;

3. Weights to be admissible should not show on their surface any blisters which may easily be broken, or any flaws or cavities into which melted lead or iron may be readily poured ;

4. The casting must not be rough or brittle, so that a slight blow may remove a portion of it ;

5. The ends of the staples should be secured with lead poured from a single melting, and in sufficient quantity to receive the stamps of verification.

6. Each weight must bear its proper abbreviated denomination, as well as the mark of the maker.

Regulations for verifying brass weights.

The regulations for verifying the series of brass weights beginning with 20 kilograms and ending with a milligram are as follows :—

1. The names of the several brass weights, their abbreviated denominations to be inscribed upon them, and their errors tolerated, are specified in the table, p. 66, in the instructions for constructing brass weights.

2. The errors specified are tolerated only when in excess.

3. The height of the cylinder of a weight with a knob must be equal to its diameter. The height of the knob must be equal to half the height of the cylinder upon which it is mounted. These provisions are not applicable to weights of 1 or 2 grams, which should have the diameter greater than the height.

4. When the weights with a knob are hollow, the maker is bound, before presenting them for verification, to secure the knob with a pin or screw of copper levelled with the surface, so that the impression of the stamp may be made upon it.*

5. The dimensions specified for brass weights, both with a knob, and in the form of conical cups, and more particularly their more essential dimensions, must be in conformity, or nearly so, with those indicated by figures 2 and 4 of plate No. V. in the Atlas, showing the mode of construction of these two kinds of weights.

6. Brass weights are to bear on their upper surface their prescribed denominations in legible characters. The mark of the maker must also be upon each weight.

7. The surface of brass weights is to be clean and smooth, without any foreign matter being perceptible that may have been driven into the metal, or any flaw by which it may be introduced.

8. Vérificateurs may dispense with impressing the stamp upon weights less than a gram.

Balances for comparing Weights.

Balances for comparing weights.

Three kinds of balances are necessary for vérificateurs.†

The largest size, for comparing weights from 20 kilograms down to 5 kilograms, or the double kilogram.

A second of a medium size, for weights from the double kilogram down to the demi-hectogram, or the double dékagram.

A third of the kind called assay balances (*d'essai*), for verifying the smallest weights, from the double dékagram down to parts of a gram.

The verification of weights being an operation which requires much precision, it is indispensable to have well-selected balances. Sensibility is their most requisite quality, but it is also essential that they should oscillate freely, and those having the longest beam should be selected in preference.

The length of beam in a balance contributes greatly not only to its sensibility, but also to its accuracy. But when selecting in preference a balance with the longest beam, an attentive examination should be at the same time made to ascertain whether the arms are strong enough to carry, without bending, the heaviest weight that is to be placed in the pans. Other things being equal, that balance is to be preferred the beam of which, when suspended on its axis, has most vertical depth, because of its being less flexible without being too heavy.

It may be ascertained that a balance oscillates freely when, having been depressed on one side by adding a small weight, it is seen to rise and fall alternately until at last it arrives at its resting point a little lower on that side where the small weight has been added, when the addition of a very small weight to one of the pans depresses it, so that it does not rise again, the balance is of that kind which is used in assaying (*trébuchets*), and is not fit for purposes of verification.

This defect is sometimes found by balance makers to arise, when they endeavour to give great sensibility to their balances, and it can be easily remedied ; it is only necessary to lower the knife edges from which the pans are suspended, or to raise the knife edge at the middle of the beam, until the balance oscillates freely.

After the balance has been thus tried, the next point is to determine the exact measure of its sensibility. For this purpose it is to be loaded with the heaviest weight that it is made to carry, and when in equilibrium, there should be added to one of the pans the $\frac{1}{2000}$th part of the weight already placed in it ; that is to say, if the balance is loaded with 2 kilogrammes in each pan, a décigramme is to be put into one of the pans.

* Modified by Circular of 15 July 1862. See p. 84.

† In those localities where weights of 50 kilograms are constructed to any great extent, the offices of verification should be provided with a balance sufficient for such weights. If not, the original verification may be made on the premises of the manufacturer, who has the proper instruments required for the process

Should the balance then be sensibly depressed, and, after several oscillations, clearly indicate this addition to the weight in one of the pans, it is to be considered as having the requisite sensibility for verification. It would be fit for verifying cast-iron weights,* even if it were found not to show this sensibility with less than $\frac{1}{10000}$th part of the weight placed in one of the pans.

To have the arms of the beam equal is another requisite quality in balances; for reasons, however, which will be stated presently, this is of no great consequence in the operation of verification, in which balances with very unequal arms may be used without inconvenience, and perhaps may be even preferred.

It may, however, be ascertained by the following method if the arms of a balance are equal, and this examination should always be made by vérificateurs before using a balance, even if the use they are about to make of it renders the inequality of the arms immaterial.

Let the left pan of the balance be designated A, and the right pan B, and any two weights, for instance two kilograms, be called C and D.

First place the weight C in the pan A, and the weight D in the pan B.

Suppose that these weights do not appear equal, and the weight C appears the heaviest, and that to restore the equilibrium an addition of a décigram must be placed in the pan A.

Let the weights now be changed in the pans, and the weight C be taken from the pan A and placed in the pan B, whilst the weight D, together with the décigram which has been added, is transferred to the pan A.

If the balance is now in equilibrium, the arms are equal, and there must be a difference of a décigram between the two weights.

But if the pan A is still the lowest, and an equilibrium can be restored only by transferring to the pan B the weight of a décigram at first added to the weight C, this will prove that the weights are equal, and the error belongs to the arms of the balance, that from which A is suspended being in excess of the other in the proportion of 10,001 to 10,000. In fact, it would be necessary, in order to make the weighings accurate with such a balance, always to take care to add to the pan B $\frac{1}{10000}$th part of the weight already placed there, to make an equipoise with the weight placed in the pan A, and such a course would not only be very troublesome, but tend to cause errors. We shall soon see how it is possible to remedy this inconvenience.

Mode of Verifying Weights.

Mode of verifying weights.

When the vérificateur is supplied with proper balances for his operations, and he has satisfied himself that they are of the requisite sensibility, he may proceed to the verification of the weights.

But before submitting them to the test of the balance, he should ascertain that they are properly and regularly constructed. He then should have before him the regulations relating to them, and as soon as he has found that the weights presented for verification exactly fulfil all the conditions, he may pass on to the comparison of their actual weight. The following method is that which he should adopt. It is supposed, in the first instance, that the vérificateur uses a balance in the arms of which there is no very sensible inequality.

The standard weight, with which the weight submitted for verification is to be compared, is placed in one of the pans of the balance; an equipoise is made by putting in the opposite pan as many minute portions of lead or other heavy substance as are requisite to make the balance in equilibrium; after which the standard weight is to be taken from the pan, and the weight to be verified is to be substituted.

If there is then an equilibrium, this weight evidently agrees with the standard; if the weight is too light it is inadmissible; if, on the other hand, it is too heavy, it becomes necessary to ascertain the amount of this excess. For this purpose the weight of error tolerated, as specified in the table, is to be placed in the opposite pan. If this addition is sufficient to restore an equilibrium, or to depress the balance on this side, the weight, though in fact a little heavy, is within the limit of error allowed, and may be accepted and stamped; if, however, this addition should not be sufficient to restore an equilibrium the weight is too heavy, and must be returned to the maker for readjustment.

For example, suppose that a brass kilogram is to be verified, and that when put into the pan of the balance designated as B, in place of the standard kilogram which has been equipoised by weights in the pan A, it is found to be a little heavy. An addition is then to be made to the pan A of a décigram and a half, or 15 centigrams, being the amount of error tolerated for a brass kilogram. If this addition depresses in its turn the pan A, the weight is within the limits of tolerance; if this addition is not sufficient to restore the equilibrium the weight is too heavy, and must be readjusted.

When a vérificateur has a number of similar weights to verify, he will do well to provide himself beforehand with counterpoises ready to his hand. He may use small pieces of lead or bits of brass, which are easy to adjust.

But in case a vérificateur should thus use counterpoises got ready beforehand, it is essential that he always place them in the same pan, and that he also place the weights to be verified in the opposite pan. It may be taken as a general rule that the counterpoise is always to be placed in the left-hand pan, and the weights in the right-hand pan.

If the inequality of the arms of the balance is such that there is reason to fear it may have an influence on the amount of error tolerated, the following method is to be adopted to prevent this inconvenience:—

The standard is to be placed in the right-hand pan, *plus* the amount of error tolerated, and the counterpoise of both placed in the opposite pan.

The weight to be verified is then to be substituted for the standard, leaving the weight of error tolerated in the pan, and if too light it is inadmissible; if on the contrary it is too heavy, the weight of error tolerated is to be removed, and if still too heavy it must be readjusted; it is admissible only in the event of its being in equilibrium, or a little light, after the weight of error tolerated is taken away.

Precautions to be taken in Verifying Weights.

Precautions to be taken in verifying weights.

Of all kinds of measures weights require to be the most accurate. As the manufacturers ought to use particular care in adjusting them, so the vérificateurs ought to take especial precautions in verifying them.

1. They should never lose sight of the fact that the accuracy of their operations depends principally upon that of the balances which they use; and they should also observe that the best balances are subject to frequent variations, the causes of which it is often very troublesome to discover.

The vérificateur should, therefore, examine his balances to ascertain if they show any variation, and if so, to remedy it; this should be done not only on every occasion when they are used, but even frequently during a succession of operations.

2. If he use counterpoises provided beforehand, they should be in one piece, and it is of importance to compare them from time to time with the standards, to satisfy himself that no accidental cause has affected their accuracy.

3. In weighing it is requisite that the weight be always placed in the centre of the pan, or as near as possible. Sensible differences and errors may arise if this rule be not observed.

4. The balances should be kept suspended from

* Weights made of iron, being more particularly intended for heavy weighings, or for weighing the more common or coarse goods, are not required to be adjusted with the same accuracy as brass weights; for this reason the errors tolerated in their verification are larger than those tolerated in the verification of brass weights.

hooks, or similar points of support; and they should not be removed from their place without necessity.

5. Care should be taken that when the balances are not actually in use they should always remain at rest, either by means of pads placed under the pans, or by a supporting frame for the beam to rest upon, in order not only to lessen the pressure of the knife edge on its bearings, but also to avoid the friction caused by continued motion.

6. It is necessary to avoid leaving the balances exposed to moisture, and to take care not to let fall upon them any water or other liquid which may affect the metal. As a general rule they should always be kept perfectly clean.

7. Particular attention should be given to avoid loading the balances with greater weights than they are intended to carry, for fear of falsifying the beam or making the knife edges shift.

Experience will suggest other precautions to be taken by vérificateurs, according to time, place, and other circumstances; general instructions only are given here.

No. 10.—Instructions for the Construction and Verification of Weighing Instruments.

Every weighing instrument differing from the usual form, or exhibiting any new arrangement in its mode of construction, should be submitted to a preliminary examination, which the Government reserves to itself the right to have made before sanctioning, if it should so think fit, the use of such weighing instrument for trade purposes.

Balances, steelyards, or Roman balances (*romaines*), and other weighing instruments, should be submitted to original verification, and be stamped, before being exposed for sale and issued to the public. They should also be submitted for periodical verification.

The principal instruments for weighing are :—

1. Balances with equal arms.
2. Large weighing machines (*balances bascules*).
3. Steelyards, or Roman balances (*romaines*).

Balances with equal arms.

Before verifying a balance with equal arms its construction should first be examined.

The beam should be regularly made, and the two corresponding sides be sufficiently alike for the eye not to be able to discover any discordance.

It is expedient that the beam be wide, and gain the necessary strength from its vertical depth than from its thickness, which would make it too heavy.

The knife edge should be permanently fixed to the beam, as well as the needle used as the index pointer.

The beam should have sufficient play in the fork of its handle, but not so much as to shift, and be allowed to bear sometimes on one point and sometimes on another.

Sensibility* is essential in a balance; to ascertain its sensibility, the method must be employed which has already been pointed out in the instructions for choosing balances intended for the use of vérificateurs.

If the vérificateur wishes to determine the degree of accuracy of one of his balances, he will note its sensibility in $\frac{1}{100}$th or $\frac{1}{1000}$th parts. Then, if he has found by experiment that, after the balance has been loaded with the heaviest weight that it is made to carry, for instance, 5 kilograms, the equilibrium cannot be disturbed by the addition of a less weight than 1 gram, he will know that this balance so loaded is sensible only to $\frac{5}{1000}$th parts of its weight.

In determining also the inequality of its arms, he will note it in $\frac{1}{100}$th or $\frac{1}{1000}$th parts. Thus, if he has found by experiment that two weights of a kilogram each require, in order to be in equilibrium, the addition of a centigram in one of the pans, he will know that the two arms are in the relative proportions of 100,001 to 100,000, that is to say, that one is longer than the other by $\frac{1}{100000}$th part.

Mode of testing new balances.

The points to be ascertained for determining that a newly constructed balance has no defect detrimental to its accuracy, are as follows :—

1. It should be solidly and regularly made.
2. It should oscillate freely, which is to be found by the method already indicated in the instructions for selecting balances for verifications.
3. The sensibility of a balance should not be less than $\frac{1}{2000}$th part of the weight it carries. When the addition of this quantity does not depress the beam on that side on which it is placed, it shows that the balance is sluggish (*sourd*) and is not of the requisite accuracy. On this point the vérificateur will have to consider the use to which the balance is to be put, whether it is a fine or a common balance, in order duly to determine the exact proportion of either its excess or deficiency of sensibility.
4. It may be seen if a balance is what is called wild (*folle*) when the addition of a very small weight depresses the pan so that it cannot rise again, even if the small weight be taken away again, so as clearly to prove the inaccuracy of the balance.
5. The equality of the arms of the beam being an essential and requisite quality in trade balances, the vérificateur will test them in this respect by placing two equal weights, duly verified, in the pans, these having been previously counterpoised, if necessary. If the equilibrium continues, the arms of the balance are equal.

Large Weighing Machines (*Balances Bascules*).

Large weighing machines (*Balances Bascules*).

This kind of balance is authorized exclusively for wholesale trade purposes.

The specification of the weight they carry, to be not less than 100 kilogrammes, must be engraved on a plate of brass, inlaid in the wooden upright frame piece of the balance.

The vérificateur must satisfy himself that the balance bascule is solidly and properly constructed, and that the oscillations are sufficiently evident.

He will test the accuracy of the machine by placing upon it, after having first counterpoised them, two metric standard weights, of which that upon the platform or weigh-bridge (*tablier*) is tenfold that upon the pan (*petit plateau*). If the balance is then in equilibrium, it will prove that it is constructed in the due proportion of 1 to 10, a special and strict condition for the accuracy of the weighings.

The vérificateur must also test the sensibility of these balances bascules, which should not be less than $\frac{1}{1000}$th part of the weight they carry.

No weights are allowed to be used with the balances bascules, except those constructed according to the forms and denominations prescribed generally for Metric weights; but the vérificateur should take care to be scrupulously exact, both in seeing to their adjustment and in verifying them, because from the mode of construction of these weighing machines, each weight used with them represents tenfold its actual weight.

Steelyards (*Romaines*).

Steelyards (*Romaines*).

A steelyard* is an instrument which combines the properties of a balance and a weight; it is a kind of balance with the arms very unequal. At the end of the small arm a hook or pan is suspended, intended to support such commodities or articles as are required to be weighed. A constant weight is moved along the other arm, and is brought nearer to or

* Under the article "Mechanics," in the Library of Useful Knowledge, 1829, it is shown that the following conclusions may be drawn with regard to the sensibility of a balance :—

1. All other things being the same, the sensibility of a balance is increased by increasing the length of its arms.
2. All other things being the same, the sensibility is increased by diminishing the weight of the beam.
3. The sensibility is increased by diminishing the distance between the centres of gravity and motion.
4. The sensibility is increased by diminishing the distance of the line joining the points of suspension from the centre of motion.
5. The sensibility is greater when the load is smaller.—H. W. C.

* See also Circular of 15 Nov. 1861, p. 83.

further from the fulcrum, until it comes to an equilibrium with the weight on the opposite side. Some steelyards are also constructed with two fulcrums, so that one side is heavy and the other light. These kinds of weighing instruments consequently require a double verification, the process of which is the same as that hereafter directed for the ordinary steelyards.

It is necessary in order that the steelyard be accurate,

1. That it has plenty of motion on its centre of oscillation, that is to say, that the knife edge on which it oscillates has its edge sufficiently fine for the beam to move quite freely upon it;

2. That an equilibrium is obtained by its oscillations;

3. That the lever is strong enough not to bend under the weight with which it is loaded;

4. That the pivot which passes through the upper part of the lever has not too much friction in the fork of the handle;

5. That the divisions of the arm of the lever are equal amongst themselves.

If these conditions are fulfilled, all that remains is to verify the divisions at two different points, and preference should be given to the first and last divisions. This verification is very simple, and does not depend on the moveable weight, which may be arbitrary. If the steelyard is intended to weigh from one kilogram up to twenty kilograms, it should have the principal divisions marked upon its long arm, by kilograms, numbered 1, 2, 3, &c. up to 20, and each interval should be subdivided into 10 equal parts, to show the hectograms. Their correctness may be proved by placing in the pan, or hooking on, successively a standard kilogram and 20 kilog., and ascertaining the equilibrium by the moveable weight, which in the first case should be found at 1, and in the second case at 20.

The instrument will be good and admissible if the equilibrium is thus found. It would even be admissible if, in order to establish an equilibrium, it should be requisite to add to the pan or to the weight hooked on a weight not exceeding $\frac{1}{500}$th part of the weight previously placed there; that is to say, not more than 2 grams, if the weight put into the pan, or hooked on, is a kilogram, or 40 grams when it is 20 kilograms.

The amount of tolerance, which considerably exceeds that allowed for ordinary balances, has been so fixed, because steelyards, although they have for many years attained a certain point of perfection, yet are, upon the whole, susceptible of improvements in their construction.

No steelyard that does not oscillate is admissible for verification; every other kind is prohibited.

It may be useful to specify summarily the requisite conditions for a steelyard to oscillate, as well as the principal causes of irregularity in some of these instruments.

The peculiar arrangement of their knife edges should be such that the line of the edge, as well as the bottom of the notches constituting the divisions of the long arm, should be placed exactly in the same straight line, passing very near and a little above the centre of gravity of the whole of the instrument; under these circumstances the steelyard will oscillate.

The sensibility of the steelyard is so much the greater as the bearing of the knife edge, upon which the movement works, is placed nearer the centre of gravity.

When the line of the knife edge passes exactly through the centre of gravity, the steelyard is inactive, that is to say, it remains immoveable in every position.

When the line of the knife edge is found under the centre of gravity instead of being above it, the steelyard then will be found to be what is called wild (*folle*); it falls first on one side, then on the other, without being able to recover itself.

This irregularity exists particularly in steelyards which do not oscillate, the use of which is prohibited.

General Observations.

Gener observ tions.

All weighing instruments, without distinction, should bear the name or the mark of the maker.

Vérificateurs can proceed, on the premises of the manufacturer, with the verification of balances with large beams, balances-bascules, and steelyards carrying a heavy weight, on condition of the manufacturers being provided with the requisite quantities of weights duly compared with the standards, and verified and stamped, as well as the other apparatus necessary for the work.

The stamp of original verification is to be impressed upon every new instrument for weighing, duly authorized, when its accuracy has been tested. Vérificateurs are recommended to use every proper precaution in the operation not to damage these instruments. The stamp may be put either under the knife edge upon which the beam oscillates, on the tail piece (*cul-de-lamp*), or the head (*chef*) of the beam, or upon one of the arms of balances and steelyards.

Manufacturers are not compelled to deliver their balances with equal arms for verification, quite finished and provided with pans; it will be sufficient if the beams alone of these kinds of balances are submitted for verification and stamping.

Besides balances with equal arms, *balances-bascules*, and steelyards, just mentioned, there are other weighing instruments which have been authorized to be used more or less generally. Some of these instruments have the length of the levers so constructed as to exhibit the weight in the proportion of 1 to 100, instead of 1 to 10, as in the ordinary *balances-bascules*.

As to any other particular weighing instruments, reference may be made to the regulations concerning them, which authorize their construction and determine their use.

No. 11.—Instructions for the Construction and Verification of Measuring Instruments.

11 Constr tion an rificati measur instru- ments.

Regulations respecting Frames for Measuring Firewood.

Frames measur firewoo

1. There are three kinds of frames for measuring firewood, one for the *stère*, the second for the *double stère*, and the third for the *demi-décastère*.

2. The frames as ordinarily made should be constructed of sound wood, well-seasoned and planed, and so that their several pieces show no change for a long period, either in their dimensions, or in their distance from each other,

3. Every frame should consist of a sole, two upright pieces, and two angular supports, it should have besides two under pieces.

4. The length of the sole between the uprights should be a metre for the frame of the stère, two metres for that of the double stère, and three metres for that of the demi-décastère. There should be the same length between the tops of the uprights.

5. When required for wood a metre in length, the height of the uprights should be a metre for the stère and double stère, and 1·667 metre for the demi-décastère.

6. The height of the uprights for the frames of the stère, double stère, and demi-décastère is regulated by the length of the pieces of firewood, as may be seen in the following table. They should bear directly upon the sole, without any vacant space between them, be level along their vertical surfaces, and be furnished at the top with an iron plate, let in flush with the wood, and firmly fixed, overlapping the upper ends of the uprights.

7. Errors in excess or in deficiency are only tolerated provided that they do not exceed in the whole 5 millimètres for the stère, 8 for the double stère, and 15 for the demi-décastère. For example, in the stère, if the length of the sole between the uprights is too much by 2 millimètres, it is requisite that the excess in the height of the uprights should not be more than 3 millimètres.

8. The length of the under pieces is to be 2 décimètres longer than that of the sole between the uprights; their width and thickness to be the same as the width of the sole.

9. Every frame should bear its proper name upon each of the uprights, written in a legible and durable manner. It should also bear the name of the maker.

10. The frames of the stère and double stère may also be made of iron, but are subject to the general regulations as to accuracy, and the manufacturers should also be bound to place several small bits of pewter on each frame, to facilitate the impressing the stamps.

TABLE of the Heights of the Uprights of the Stère, Double Stère, and Demi-décastère, according to the different Lengths of the Logs, from 1 mètre to 140 centimètres.

Length of Logs.	Height of Uprights.	
	Of the Stère and Double Stère.	Of the Demi-décastère.
Mèt. Cent.	Mèt. Mill.	Mèt. Mill.
1·00	1·000	1·667
1·02	0·981	1·634
1·09	0·962	1·603
1·06	0·944	1·573
1·08	0·926	1·544
1·10	0·910	1·516
1·12	0·893	1·489
1·14	0·878	1·463
1·16	0·863	1·437
1·18	0·848	1·413
1·20	0·834	1·389
1·22	0·820	1·367
1·24	0·807	1·345
1·26	0·794	1·323
1·28	0·782	1·303
1·30	0·770	1·283
1·32	0·758	1·263
1·34	0·747	1·244
1·36	0·736	1·226
1·38	0·725	1·208
1·40	0·715	1·191

The preceding instructions for the form of these wooden frames is more particularly applicable to measuring instruments of this description, which are used in woodyards and shops for firewood, established in towns. But the same pattern must be used, when the frames are moved from place to place, together with the wood, by itinerant dealers, who are obliged to measure the wood when they deliver it.

There can be no inconvenience in persons using simple sash frames, formed of two uprights fixed by tenons upon the sole, and kept at their proper distance from each other by a cross piece morticed on the top. These sash frames can be made very light and easy of transport, as they can be taken to pieces at will. Portable iron frames may also be made.

Vérificateurs should, according to the locality, test rather the solidity and accuracy of the frames than their actual form. They will affix the stamp to those that appear to them to fulfil the conditions requisite for the use to which they are intended.

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No. 12.—INSTRUCTIONS FOR THE STAMPS OF VERIFICATION, AND THEIR USE.

A complete assortment of uniform stamps intended as marks of original and periodical verification, for the use of a *bureau de vérification*, is composed of 24 stamps, several of which have numbers upon them. Eleven are engraved with a crown, and 11 with the annual letter.

Stamps with a Crown, to be used by Hand.

No. 1. Series for the mark of original verification of large iron weights.

No. 2. For wooden measures of length.

No. 3. For middle-sized and small iron weights.

No. 4. For large balances, balances bascules, and large steelyards.

No. 5. For small balances, and small steelyards.

No. 6. For large and middle-sized brass weights.

No. 7. For small brass weights.

No. 8. The largest sized stamp with a crown used by hand serves as the mark of original verification of wooden frames of the stère.

Stamps with a Crown, adapted for a Press.

These are three in number.

No. 9. The largest is the mark of original verification of large wooden measures of capacity.

No. 10. The next of middle-sized and small wooden measures.

No. 11. The smallest, of metal measures.

The 11 stamps with the annual letter serve for similar purposes when used in the periodical verification.

Mode of stamping.

In applying the hand stamps, they should be held perpendicularly to the surface of the instrument to be marked, and struck with a hammer. It is necessary to avoid making a ragged edge, which will be seen at every projecting part of the impression, when too strong a blow is given, or when due attention is not paid. The preservation of the stamps is much dependent on the address with which this operation is performed.

The stamps with a crown are to be affixed only to the weights, measures, and weighing instruments presented for original verification.

None of these stamps should be applied when hot; they are intended to be used cold. The impression of a cold stamp is prescribed generally as a proof of the original as well as the periodical verification of all kinds of weights and measures. They may be used with ink and a pad, to make the impression more apparent on wooden measures.

The stamps with a crown, intended to be fitted to presses, have on their stem, which is cylindrical, a notch to receive the end of a screw which fixes the stamp in its place. This screw should have a head, and be fixed in the front of the press, so as to be screwed and unscrewed at pleasure by means of a turnscrew. The fixed presses now used in the *bureaux de vérification* are thus made. In the description of the vérificateur's kit, which contains the necessary apparatus for the periodical verification, there will be found the requisite explanations of the stamps with the annual letter, adapted to the press which is also part of this kit.

In the event of a bureau not being furnished with a fixed press, there will be no inconvenience, if the operations are not of importance, in using the small press for the marks of original verification of measures of capacity, the three stamps being adapted for both kinds of presses. It is, however, recommended, when employing either press, to apply the stamp lightly, using only just sufficient pressure for the purpose; and it should be observed that the direction to make this impression as light as possible does not authorize using more force than what is found absolutely necessary.

The stamps with the annual letter should for the most part be affixed on the weights and measures by the side of the marks both of original verification and of annual marks previously made. Vérificateurs should take care to refer to the regulations applicable to each description of weights and measures. As to balances, the annual letter should be affixed either on the pans or on the platform.

Manufacturers are bound to fix two bits of pewter on their tin-plate measures, one on the junction of the bottom with the body of the measure, the other near the rim. The impression of the crown ought to be made on the first of these two. As it might be difficult to use the presses intended for this process, the stamping of these kinds of measures may be effected by placing a beaked anvil inside them, and then using

the hand stamp No. 6 with a crown, and making the impression with a hammer. The impression of the annual letter is to be made on the other bit of pewter, which should be found near the rim of the measure; for this purpose, the small press and the proper stamp may be used, in conformity with the detailed instructions contained in the description of the vérificateur's kit.

The 22 stamps composing the full set should be sufficient for marking all weights, measures, and weighing instruments; and vérificateurs should conform to the regulations prescribed for the respective use of each stamp; they will serve, also, by analogy, for using the most proper stamp for any weights, &c., that they may be called upon to mark, besides those recited in the present instruction.

13. Preservation of standards and apparatus.

No. 13.—Instructions for the Preservation of the Standards and Apparatus entrusted to Vérificateurs.

Standards.

Vérificateurs ought to consider the standards of weights and measures as very precious things, and in some sort sacred, the handling of which is entrusted to themselves alone, and which should never be out of their proper place. A vérificateur who should allow himself to entrust a standard, either to a manufacturer, or to any other person, would incur the punishment of dismissal, without prejudice to any other penalties to which the loss or damage of his standards would expose him.

Vérificateurs should themselves use the greatest precautions in the use which they make of the standards, because the smallest alteration would cause the loss of all their value.

The fall on the pavement of a standard measure of length might render it absolutely unserviceable, either by falsifying it, or indenting, or breaking off a corner. Such an accident should then be avoided with the utmost care.

These measures should never be stood upright against a wall; they should always be placed flat upon a table, or in a press, or in the box intended to hold them, when they are not actually in use.

Standard measures of length and of capacity, made of brass, and pewter measures, require much care, particularly as regards the oxydation of the metal, from which the measures of capacity may be preserved by never letting them remain in water, by wiping them each time with a fine cloth, and making them dry before putting them away. There should, however, be no less attention paid in keeping them all from any blow or fall, which, by altering their form, would also alter their length or capacity and render them unserviceable.

But the greatest precautions are to be taken in preserving the standard weights.

The continual use of the same weights soon alters them. Besides, the weights habitually used should be frequently wiped to remove the dust which settles on them; and in this operation a small portion of the material must always be removed. This is a fact which every vérificateur can easily prove to himself by the first brass weights delivered to him; in rubbing them with a fine cloth, if only to make the metal brighter, he will cause them to lose several milligrammes of their weight.

To prevent all these evils, it is indispensable then for each bureau de vérification to be furnished with a set of common standards for daily use, whilst the real standards are carefully preserved in their box, to be had recourse to in case of necessity, and in order to verify from time to time, for example, every six months, his common standards, which should be duly adjusted with the real standards, whenever any deviation is found in them.

Apparatus of verification.

The preservation of the apparatus for verification requires as much care as that of the standards.

Attention must be given to preserve all iron instruments from rust; they should be rubbed from time to time with a cloth impregnated with oil.

Wooden instruments, such as duplicates of standards, &c., should be preserved as much as possible from damp.

Brass gauges require no other special attention than to keep their ends from injury by a fall.

The only precaution to be taken with respect to hoppers is to be satisfied from time to time that they let all the grain run through.

As for strikes, they necessarily get worn at the ends by daily use; they should be looked at and set right.

The preservation of balances demands much attention and delicacy.

That the arms of balances used for original verification should be kept quite equal is not in any respect a matter of importance to vérificateurs, because, as they perform this operation by substituting one weight for another, they can as well use a balance the arms of which are sensibly unequal, as one with the arms perfectly equal.

What is really essential is that their balances should always have the same sensibility, without being sensitive to a fault (*trébuchantes*).

The sensibility of a balance diminishes by the alteration of the knife edges from continual use; it may also be diminished by rust attaching either to the knife edges or to the bearings on which they rest.

Vérificateurs should, therefore, make frequent experiments to satisfy themselves of the sensibility of their balances; whenever they observe a marked diminution of their sensibility, they should ascertain the cause and endeavour to apply the proper remedy.

14. Vérificateur's (nécessaire)

14. Description of the Vérificateur's Kit (nécessaire) specially required for the Periodical Verification.

Vérificateurs ought to look well into all the details contained in the following description; they should study them, and practise the taking up and replacing, as well as using the several instruments which the kit holds.

This description is divided into two distinct parts. The first, under the head of *Technical Description of the Instruments comprised in the Kit*, will make them acquainted with the form of every instrument, and its place in the kit. The other, under the head of *Use of the Instruments comprised in the Kit*, will specify the purpose for which each is intended, and the precautions to be taken in using it.

1.—*Technical Description of the Instruments comprised in the Kit.*

Descri of inst ments prised

The several instruments are held in a box with compartments made to receive them; it is furnished with handles to facilitate its transport, a lock, and two hooks to keep it closed.

Drawings of all the instruments are to be found in the accompanying *Atlas*. Every instrument bears a number corresponding to that fixed to its place in the box. These numbers will be referred to in the following description of the instruments.

Figure 1 represents the box open. In the lower part ABCD, the places of each instrument are indicated, and in the upper part ADEF, the cushions made of cork covered with cloth, to prevent the instruments shaking about when the box is closed. A few secondary tools are always put there.

Figure 2 represents the box closed. It is then 16 centimètres high, 27 centimètres broad, and 1 metre long. In the lower part are the following instruments:—

Figure 1, No. 1. *A balance with its pans.*—The two pans only are placed in the circular space No. 1, by folding the chains and securing them between the two pans. The upper pan is kept down by three small catches. The arms of the balance are then laid in the compartments *a* and *b*.

No. 2. *A kilogram and set of conical cup weights*, twelve in number, viz.:—

1	weight	of	1 gram.
2	„		2 grams each.
1	„		5 grams.
2	„		10 grams each.
1	„		20 grams.
1	„		50 grams.
2	„		100 grams each.
1	„		200 grams.
1	„		500 grams.
12			

They are so constructed that the weights of the same value are alike in all their dimensions. This kilogram is placed in compartment No. 2.

No. 3. *A brass stamping press*, composed of a winch-handle *c*, a screw *d*, and a fastening screw *e*, moving a circular plate covered with leather, which enables the press to be firmly secured to a table. On the right and left of the screw *d* are two small cylindrical guides, by means of which the screw always moves in the line of its axis. *f* is the head of a screw, which terminates in a point, and fixes the stamps adapted to the press by entering a notch always made for that purpose on the stem of these kinds of stamps. This stamping press is laid in compartment No. 4 and in those designated by the letter *h*.

No. 4. Small *cylindrical block*, upon which weights are to be placed similar to those forming subdivisions of a kilogram. This little cylinder screws into one of the compartments No. 4 in Plate Fig. 3, and can thus receive the shock of the blow given by a hammer in stamping.

No. 5. Small *conical block*, smaller than the preceding, for the smaller weights.

No. 6. Small *cylindrical block*, used with the brass press, and adjusted to it when required for stamping.

Nos. 7, 8, and 9 are *stamps*. They are shown both in vertical and horizontal section. The letter A is seen on No. 7, being the mark of the year 1840.

Before speaking of the *hand stamps*, attention should be directed to Fig. 3. This is a metallic plate that may be placed on a table, and in which there are several circular holes. The use of two of these holes has been explained in the description of Nos. 4 and 5. The other holes are meant to receive different weights with knobs, that are turned up and marked underneath. The largest of these holes is intended for ordinary brass weights, that are marked on the top and on the knob.

This metallic plate has its place in the box. It is put in the compartment between Nos. 7 and 10, and *q* near No. 16.

Nos. 10, 11, 12, 13, 14, 15, 16, and 17. *Different hand stamps used with a hammer.*—They are shown in vertical and in horizontal section. The letter A is seen engraved on the latter section of No. 10.

Nos. 18, 19, and 20 are *two small anvils and a beaked anvil.*—They are fitted to the part *j* of the press and receive on their spherical head the measures of capacity to be stamped. These spherical portions are constructed so as to adjust themselves as accurately as possible to the measures.

No. 21. *Sliding lever weight.*—This is shown in vertical section (Fig. 2), placed on the arm of the steelyard.

No. 22. *The pan of the steelyard* (Fig. 2).—Its place in the case is designated by the same number, where it is to be put after being detached from the stand, and the wooden claw *k*, *l*, fits into the upper part of the pan, keeps it down, and prevents it from shifting.

No. 23. *Iron stand of the steelyard* (Fig. 2).—It has a pedestal ending in a screw, the height of which is 16 millimètres. This screw is fitted to a nut let into the top of the box. The upper part of the stand ends in a hook, from which the ring at the top of the fork is suspended. It is placed in the case by laying the longer side between the stops *m* and *n*, and the short side between *n* and *p*.

No. 24. *The arm and fork of the steelyard* (Fig. 2).—These are in one piece, which is placed longitudinally in the case and lays on the compartment designated by the letter *q*.

No. 25. *Large brass gauge for grain measures.*—On one of the sides is marked the series of measures —0·05, 0·1, 0·2, 0·5, 1 litre, 2, 5, 10, 20, 50, and 100 litres. Each division has a projecting shoulder. This gauge is kept in its place along the case by the two stops *r* and *s*.

No. 26. *Small brass gauge for liquid measures.*—On one of the sides of the gauge the measure of the diameters is engraved, from the centilitre to the double litre, the divisions being marked by a projecting shoulder; on the other side are the heights of the same measures. This gauge is fixed on one of the sides of the case between the stops *m* and *o*.

No. 27. *Double décimètre subdivided into millimètres.*—This is laid along one of the sides of the case, between the stops *t* and *q*.

No. 28. *Two small sliding lever weights.*—These are of similar form, though of different weight, one of them being marked with the figures 10 and 20. They are used separately on the notches of the steelyard marked with the letter T.

The box itself thus contains 28 different instruments. Its lid also holds some, which are as follows:

No. 29. *Large hammer for stamping weights and measures.*

No. 30. *Small hammer* for the same purpose.

No. 31. *Turn screw* to be used for the brass stamping press.

All the parts marked inside the lid with dotted lines represent the position of cork cushions, which, when the box is closed, hinder the several instruments upon which they press from shifting and getting mixed up together.

No. 32. *Wooden mètre in two pieces.*—When these are joined together, each being a demi-mètre, they make the full length of a mètre.

No. 33. *Small brass block*, on which the pans of balances are placed when stamped with the mark of periodical verification.

2.—*Use of the Instruments comprised in the Vérificateur's Kit.*

Use of the instruments

The vérificateur before beginning his work should take from the box all the tools or instruments he requires, lay them carefully on the table, and close the box, locking and fastening it with the hooks, so as to keep everything secure.

The first operation is to fix the iron stand (No. 23) square upon the closed box (Fig. 2).

It has been stated that the stand has underneath it a pin with a screw on it. It is thus to be screwed into the brass nut fitted on the top of the box, and the stand being fixed, the short side ought to be parallel to the length of the box. In this position either the balance with equal arms, or the steelyard, can be suspended from it.

Balance with two pans, No. 1.—This is used for verifying weights from the kilogram down to a gram, and even under.

The beam of this balance is to be suspended from the iron stand. When the hooks and the pans are properly placed the index should be at 0, and the oscillations equal on each side. If they are not so, the vérificateur is to counterpoise one of the pans until the index pointer stands at 0.

Although the mode of weighing by a counterpoise, as recommended in the instructions, refers more especially to the verification of new weights, the vérificateur should always have counterpoises ready beforehand. This mode, however, has some inconveniences in comparisons made on the premises. Besides, weights submitted for verification ought already to bear the mark of original verification, and

the principal object is to ascertain whether they have lost their original accuracy.

The balance is therefore constructed so as to have the two arms as equal as possible.

The vérificateur is to place the standard weight (No. 2) in one of the pans and the weight to be verified in the other. This operation being a simple comparison of two weights in the opposite pans, requires no other explanation.

Brass stamping press, No. 3.—The vérificateur is to fix it to a table, bench, or other steady object, by means of the fastening screw *e*, made to move with a key or lever.

The press being steadily fixed, the stamping of all wooden or metallic measures of capacity can be proceeded with. Small blocks of brass with rounded surfaces, suitable for the internal surface of the different measures of capacity, as may be seen under the Nos. 18, 19, and 20, are made to fit tight into the under part *j* of the press. The vérificateur should carefully select beforehand whichever block is suitable for the measure of capacity to be supported on it, which may be done by trial with the hand. He will thus satisfy himself that the curved surfaces coincide.

The three stamps, Nos. 7, 8, and 9, being the marks of the annual letter, fit successively into the part *f*, *g*, of No. 3, and should be firmly fixed by means of the small pointed screw, which ought to enter the notch on the stem of the stamps.

The stamping press being thus ready, that part of the measure of capacity where the stamp should be affixed is placed between the brass block and the stamp ; the winch handle is turned until the impression of the stamp is made upon the measure, taking care to use no more force than is absolutely necessary. The preservation of the stamping press imperatively demands that every precaution should be taken.

By means of the iron screw No. 31, the stamps required to be used are easily fixed in their place and removed.

The following precautions should be taken with the two smallest measures, which cannot be placed under the press, their diameter not allowing it.

A block of iron with a cylindrical stem (No. 20) is fitted into the under part *j* of the press. This stem serves as a support for the two smaller measures, which are marked by using the hand stamps, Nos. 13, 16, or 17, and the small hammer No. 30.

To obtain more steadiness for the operation, the screw *d* should be let down, so as to bring upon the iron block the cylindrical block No. 6, which should have been previously fixed in the part *f*; the cylindrical stem of No. 20 will thus be in a condition to receive the gentle blow of the hammer upon the circular side of the measure, without altering its position.

Before explaining the method of using the steelyard, attention may be drawn to the metallic *plate with circular holes* (Fig. 3), which serves for stamping iron and brass weights.

This plate is to be placed upon a table, one of its faces presenting a plane surface. On this face the large iron and brass weights are to be placed, which are to be struck successively with one of the stamps, Nos. 11, 13, or 14, by means of the hammer No. 29. The measures of length may also be stamped by placing them on the same face of the plate, and using the stamp No. 12.

On the other face of the plate are circular holes; the largest is meant to hold the ordinary brass weights, which are marked on the top under the knob.

The other holes, except 4 and 5, are intended to hold the several kinds of small weights. These weights are turned up and receive the stamp underneath.

For *cup weights* and *piled weights*, the small cylindrical block No. 4, or the conical block No. 5, is screwed upon the same face of the plate. The cup weights are to be reversed and marked underneath, by means of the hand stamps and hammers.

All the weights of this shape and piled weights, including the kilogram, may be marked in the same manner.

Hand stamps used with the hammers.—The vérificateur must be careful, with the view to their preservation, to hold the stamp perpendicular to the surface of the material to be stamped, and to strike gently upon the stamp with the hammer, in order to avoid broken edges, which would be caused without this precaution at every projecting part of the impression.

Oscillating steelyard (Fig. 2).—This is used for verifying iron and brass weights of 1, 2, 5, 10, and 20 kilograms.

The body of the steelyard is composed of the two brass forks, and a graduated beam of iron.

The ring of the upper fork is attached to the hook of the horizontal arm of the iron stand No. 23, when this stand has been fixed as has been just explained ; that is to say, when the arm has been placed parallel to the length of the box.

The lower hook is to sustain the brass pan and chains.

The vérificateur should use every precaution to avoid violent shocks ; it is of much importance for the accuracy of the weighings that the knife edges of the steelyard preserve their sharpness, which they would soon lose if sufficient attention were not given to the handling of the instrument or the mode of operating.

The several parts being duly arranged, the first observation should be to see that nothing impedes the movement of the instrument ; for example, if the side of a knife edge touches any part of the steel bearing, less sensibility is the result. Care must therefore be taken properly to arrange with the hand the several parts of suspension, so that each is in place, before proceeding to verify the weights.

When the steelyard is perfectly in equilibrium, the index should point to 0, that is to say, exactly in the middle of the two sides of the fork, and when all the parts are duly arranged the oscillations should recur equally on the two sides of the fork.

In the event of the steelyard having lost its original accuracy, it will be easy to rectify it by adding a thin sheet of metal to the pan, if it has lost any part of its weight.

If on the contrary the pan, or any other part suspended from the end of the beam, should have gained in weight, any foreign matter attracted to them during the course of the operations should be removed by scraping.

This steelyard is an instrument of great accuracy, and it may be useful to prove this to vérificateurs.

Fig. 4 shows the upper fork in two different views ; *a* is a part made of cast steel, tempered hard, upon which the knife edge of the steelyard rests. This knife edge is sharpened in proportion to the weight upon it, and it should touch at one point only of the steel segment, that is to say, the knife should have no other point of contact. The length of the knife edge is besides shorter than the distance between the two sides of the fork.

Fig. 5 shows the lower fork, also given in two positions; the knife edge bears only upon one point of the steel segment *a*.

Lastly, the pan of the balance bears upon a third steel segment *b*, in order to reduce the friction.

It will thus be seen that the smallest difference in the weight must be ascertained to a very sensible degree, and a considerable divergence of the index caused thereby. For ordinary use, the openings through which these knife edges may be seen are covered up.

It should be remarked that on the beam of the steelyard there are some small notches designated by the letter T, and to be found between the other notches which show the right place for the weights of 1, 2, &c., kilograms.

This letter signifies *tolerance*.

The notch T placed at the right of each figure representing the weight indicates exactly the limit of tolerance, fixed in excess only, for each weight.

If the steelyard is not in equilibrium when the small sliding weight is put upon one of these notches marked T, the weight to be verified must be rejected.

There are two small sliding weights, No. 28, to be used with the steelyard. One of these, bearing the figures 10 and 20, is specially intended to show the limits of tolerance of weights of 10 and 20 kilograms. The other serves the same purpose for all the weights from 1 kilogram to 5 kilograms inclusive. It will be easy to distinguish at a glance which of the two small sliding weights should be used, according to the weight under comparison on the pan.

The table of errors tolerated is as follows :—

For 1 kilogram,	an error is tolerated of	1	gram.
„ 2	„	„ 2	„
„ 5	„	„ 4	„
„ 10	„	„ 6	„
„ 20	„	„ 10	„

Supposing that a weight of 10 kilograms is to be verified. It is to be placed in the pan No. 22, and the sliding weight No. 21 on the beam of the steelyard is to be placed in notch 10, corresponding to the weight of 10 kilograms.

If they are in equilibrium, or if the oscillations of the index recur equally on the two sides of the upper fork, the weight is accurate.

The weight will be too heavy if the index of the steelyard inclines to the side where it is placed ; but as an error of 6 grains in excess is tolerated for 10 kilogram weights the weight is further tested by placing the small steel sliding weight No. 28, which is used only for testing the limit of tolerance, on the notch T nearest to, and on the right of the notch No. 10.

When the addition of this sliding weight restores the equilibrium or moves the index to the side on which it is placed, the weight in the pan is admissible and may be stamped ; if not, it is too heavy and must be rejected.

The weight under comparison will, on the contrary, be too light if the moveable brass counterpoise placed in the notch No. 10 of the beam inclines the index to that side ; in this case it should be readjusted.

The preceding observations and the same mode of operation will apply equally to every other weight to be verified. Thus, for the weight of 2 kilograms the sliding weight is to be placed at notch 2 ; for 5 kilograms at notch 5, &c.

It is very essential to pay attention that in verifying a weight with the steelyard it is imperative first to place it in the pan, and then to suspend the brass counterpoise on the beam of the steelyard at the proper notch. But after the comparison is made the following is the proper order of proceeding : (1) to remove the counterpoise from the notch and place it on the right-hand side ; (2) to take the weight which has been compared out of the pan. It is particularly to be observed that the fall of the counterpoise and its consequent deterioration would be inevitable if the weight were removed from the pan before the counterpoise employed had been unhooked from the beam. A simple and easy means of preventing every kind of inattention in the verification of weights will next be shown.

Vérificateurs can construct at very little expense a wooden moveable frame ; at its base it will fit on the top of the box, and at its top it should take the form of a fork, so as to support the long lever between the figures 10 and 20. The height of the top of the support should be calculated according to the distance to be conveniently reserved for the oscillations of the balance. The support being thus arranged, anyone may perceive that if, from any cause whatever, the weight under comparison should unduly and prematurely be removed from the pan, the long lever loaded with the brass counterpoise could not be depressed further than the distance reserved for its free movement, and thus the brass counterpoise would remain in its notch, without fear of any accident. However, as this support, or any other similar contrivance, can serve no other purpose but to prevent the want of proper attention, it will be for vérificateurs to consider whether they should provide themselves with it.

It remains only to refer to the gauges and measures of length.

Brass gauges.—These are two in number, Nos. 25 and 26. The first, No. 15, serves for verifying grain measures of capacity ; the other, No. 26, for verifying liquid measures of capacity from the double litre to the centilitre. The verifications are intended to test the due height and diameter of these measures.

In verifying the height, it is sufficient to place the gauge vertically in the measure of capacity, and along the cylinder. For grain measures, it should be observed if the upper circular edge corresponds with the projecting shoulder upon one of the sides of the gauge, opposite to which is the figure expressing the proper height. For liquid measures, from the double litre to the centilitre, their height is to be tested by the line traced and the figures engraved on one of the sides of the small gauge.

For the verification of the diameters, one end of the brass gauge is to be placed horizontally against the upper circular rim of the measure, and the gauge is to be moved along the rim until one of the projecting shoulders touches the other end of the diameter, and opposite the shoulder is the figure which shows the diameter of the measure.

Grain measures of capacity should have their diameter equal to their height, and liquid measures, from the double litre to the centilitre, the height double their diameter ; but irregularities in these proportionate dimensions are not to be taken too strictly into account, and if they appear to compensate each other the measure may be admitted for periodical verification.

Wooden mètre.—The two equal parts forming together a mètre are to be joined by means of a screw and all measures of length verified by placing them against this measure.

Wooden double décimètre.—This is to be used by vérificateurs for comparing smaller measures, and for testing and expressing in millimètres any differences which they may discover in the course of their operations.

When a vérificateur has concluded all his verifications, he should carefully wipe the instruments he has been using ; replace them in the box and always in the same place ; shut the box gently and without forcing it ; and not forget to lock it and secure it with the hooks.

The preceding instructions for the construction and verification of weights, measures, and weighing instruments, bear date at Paris, 19 Dec. 1839, and have the signature attached of " L. Cunin-Gridaine," Minister of Agriculture and Commerce.

Additional instruction for construction and verification of oil measures.

By an appendix to these instructions, the French government authorized fixed measures for the retail sale of oils, constructed in the form prescribed by the Royal Ordinance of 16 June 1839, for milk measures.

The set of oil measures is to comprise :—

The litre,	demi-décilitre,
demi-litre,	double centilitre,
double décilitre,	centilitre.
décilitre,	

The dimensions required for these kinds of measures, up to the demi-décilitre inclusive, as well as the errors tolerated in their comparison, are to be found specified in the regulations for verifying milk measures. The following table contains the regulations for the two smaller measures :—

Names of Oil Measures.	Height and Diameter.	Errors tolerated.
	Millimètres.	Grammes.
Double centilitre -	29·5	0·3
Centilitre - -	23·4	0·4

Measures intended for the sale of oils are subject, both as to their mode of construction and their verification, to the regulations contained in the instructions for milk measures. They should all be provided with a handle of the form specified for the litre in Plate III., Fig. No. 3 of the Atlas ; and in addition, the letter M should be stamped upon the outer surface of the body of measures of oil to be used as food, whilst the letter B should distinguish those intended for lamp oil.

Supplementary Decrees and Official Instructions.

Supplementary decrees and official instructions.

Since the general code of official instructions, issued in pursuance of the French Metric law of 4 July 1837 and of the Royal Ordonnances of 17 April and 16 June 1839, was published, several supplementary instructions have been drawn up and circulated to the préfets from time to time from the department of the Minister of Commerce, and bearing his signature, which will now be noticed in order of date. These additional instructions from the executive department of the Government have, for the most part, been issued under the authority granted by the two Royal Ordonnances of 1839, but in those cases in which a further authority was required, it will be seen that it has been given under the hand of the President of the Republic, or the Emperor himself.

Authorizing special salt weights for customs officers.

29 Feb. 1840.—Recites the practice of weighing salt by special weights in the form of a truncated cone, and called *demi-hectolitres*, which are used by customs officers to ascertain the weight of this commodity and to fix the amount of duty, weights of this form not being in accordance with the Ordonnance of 16 June 1839—authorizes their use for this purpose without being subject to verification and stamping, provided that they no longer bear the denomination of *demi-hectolitres.*

Authorizing the measure of double hectolitre.

2 May 1840.—Recites that the double hectolitre has never been amongst the dry measures of capacity hitherto authorized to be verified and stamped, but that application has been made for its admission as useful for measuring certain articles and especially charcoal. For the convenience of trade, and in pursuance of the provision in the law of 4 July 1837, for allowing the use of weights and measures the double of those stated in the table appended,—authorizes the admission of the double hectolitre, when made of oak, brass, or sheet iron, in form of a cylinder of equal height and internal diameter = 634 millimètres, and subject to the same regulations as to construction and verification as other similar measures of capacity. The préfets are to transmit a copy of this circular to each vérificateur in their several departments, copies being forwarded for this purpose.

Gratuitous verification for public establishments.

15 May 1841.—Recites that after many applications have been made to them, it has been decided, in concert with the Minister of Finance, that the entrepôts of the administration of indirect taxes are to be included amongst the public establishments whose weights and measures are to be verified gratuitously, under Art. 48 of the Ordonnance of 17 April 1839.—The préfets are accordingly requested to give the necessary directions to the vérificateurs in their departments.

Further instructions for verifying and stamping pewter measures.

4 June 1844.—Recites the proportion of pure tin prescribed for pewter measures of capacity, in § 3 of the Royal Ordonnance of 16 June 1839, and the minimum weight of each description of these measures, and notwithstanding these regulations, the general practice of procuring their vérification when without handles, and then fixing to them handles of inferior metal. With the view of correcting these irregularities, directs :—

1. That new pewter measures be delivered for verification, ready for use.

2. That such measures when *without handles* be stamped by the vérificateurs with the hand stamp No. 2 on the bottom, close to the maker's stamp.

3. That measures *with handles* be stamped both on the measure itself and upon the upper surface of the handle.

4. That measures *with handles and covers* be stamped in three places, viz., on the measure itself, on the upper surface of the handle, and on the cover.

5. The small stamp with a crown to be used as formerly for the measures themselves, when they have both a handle and cover. The hand stamp with a crown, No. 4, to be used for the handle and cover.

6. All existing pewter measures which may be presented for periodical reverification, if capable of readjustment to be tested with the hydrostatic balance by the vérificateur before being stamped according to the preceding directions.

The préfets are requested to report what steps they may have taken to carry out this instruction.

Weights to be scrupulously examined before original verification.

6 April 1852.—Recites the practice of vérificateurs seizing weights and measures and weighing machines found defective, although bearing marks of original verification and stamping, and the acquittal by the tribunals of the proprietors on the ground that being stamped, such defective weights, &c. might be presumed to be correct. Calls attention to the importance in future of formal instruction being given to the executive officers to examine most scrupulously all weights, measures, and weighing machines brought for original verification, to see that they are strictly in accordance with the regulations, and that they reject all that are not so. Any carelessness in the execution of this duty being so prejudicial to the public service, an offender to be severely punished.

No vérificateur to interfere in or adjust weights.

Also draws special attention to the Circular of 31 December 1825, forbidding vérificateurs to interfere, directly or indirectly, in the sale of weights or measures, or their adjustment, on account of the grave abuses which might result. Any infraction of this rule to cause their dismissal. Although this regulation was not renewed in the Ordonnance of 7 April 1839, now in force, it must nevertheless be still observed as a fundamental rule. States its practical evasion by vérificateurs designating the adjusters as their subordinate officers, and strictly forbids this practice. It may happen that in some parts of their districts, the vérificateurs may have found it absolutely necessary that they should be accompanied by an adjuster from the chief town of the arrondissement, particularly in rural communes where there are no other means of adjusting the weights and measures. In every such case this course should first have the préfet's approval, but it is not in any way to interfere with the right of the tradesman subject to verification to choose his own adjuster. The préfet should satisfy himself of the trustworthiness of the adjuster chosen by the vérificateur, and that a proper charge is made for the work ; and also that in towns where there are several workmen to choose from, no undue preference is shown to one over another.

Or holding other employments.

States also former decisions of the incompatibility of the functions of vérificateur and the employment of agent for the purchase or sale of wine, wool, timber, &c., or of agent for a fire insurance company, or for providing military substitutes, and even of clerk in the sous-préfecture ; and directs such decisions to be scrupulously enforced ; also that the préfets report what measures they have adopted to carry the instructions of this Circular into effect.

Nomination by the préfets of departments.

26 April 1852.—Recites the Decree of 25 March 1852, granting to préfets of departments the nomination of the local officers of weights and measures.—In filling up the vacant offices of vérificateurs, preference should be given by the préfets to the assistant vérificateurs. A report of the appointment should also be made immediately to the Minister of Commerce, in order to enable a proper remuneration to be determined upon. The date, place of birth, and residence of the person appointed should also at the same time be notified, as well as the nature and extent of his previous services, whether civil or military.

Before proceeding to the nomination, candidates should be subjected, in conformity with the Ordon-

nance of 17 April 1839 and the Circular of 30 August 1839, to an examination before a special commission as therein directed. The préfets are reminded that no candidate is admissible for such examination who is less than 25 or more than 40 years of age. This examination is not to be a mere form, but should be a matter of serious consideration, and such as may guarantee to the Government and the public that the candidates to be appointed are duly qualified. A report of the results of the examination, with a copy of the proceedings, is to be duly made to the Minister of Commerce.

The acting vérificateurs are to continue to enjoy their existing emoluments, the intention of the Government being that each of these officers should maintain his position unless he should be no longer worthy of the trust confided to him. All personal expenses, as well as office charges and cost of apparatus purchased in the several localities, will be defrayed by special warrant as hitherto.

The apparatus and stamps usually forwarded from Paris to the vérificateurs will continue to be furnished to them, on requisition from the préfets addressed to the Department of Commerce.

In order that the services of the officers may be duly appreciated and recompensed, as far as possible, an annual report of their proceedings should be transmitted by the préfets to the Minister of Commerce, that it may be clearly seen how far each officer is deserving of the confidence of the Government from the zeal, capacity, and good conduct he has exhibited. Careful consideration will be given to these reports, and any saving which it may be possible to make in the establishment, as vacancies occur, will be shared amongst the oldest and most deserving of these officers in all the departments.

Particular attention will be paid to the cases of those assistant vérificateurs who may have lost any prospect of promotion by the decentralizing changes now made in the system of nomination.

As to all retiring or contingent pensions, they will continue to be paid as at present by the central department, on due notice from the préfets, and production of the requisite documents. But no claim of any officer to a pension is to be allowed by the préfets without the case being first referred to the Minister of Commerce, the approval of all such grants being necessarily dependent upon the condition of the pension fund.

All requests for leave of absence are to be carefully looked into, it being borne in mind that except in cases of illness or convalescence, certificates of which must be furnished, if the absence during the year should exceed 15 days, the officer is to be placed on half salary, in accordance with the general regulations of the Government.

As to those vérificateurs or assistant vérificateurs who may have been provisionally nominated in the department, they should be made to pass the usual examination before being permanently appointed. If in any instance this regulation may have been overlooked, it should be enforced. The Government, however, have every disposition to take into account the experience which these officers have gained, and not to be too strict with them in requiring proof of purely theoretical knowledge, provided, on the other hand, that they have sufficient practical experience. In order to expedite the making out the permanent appointments, they may be transcribed upon the instrument of provisional nomination, at the same time taking care to recite the Ordonnance of 17 April 1839, the provisional nomination, and the Decree of 25 March 1852.

The préfets are requested to acknowledge the receipt of this Circular, and to make the officers of weights and measures in their several departments acquainted with its provisions.

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24 June 1852.—Recites that many representations have been made by vérificateurs of a difficulty that has arisen in carrying out the provisions of Art. 3 of the law of 27 March 1851, for repressing certain frauds in the sale of commodities. This law inflicts penalties of fine and imprisonment upon dealers in whose shops or warehouses false weights or measures are found. Moreover, offences of this nature are classed as misdemeanors. Persons thus proceeded against have called in question the legal authority of the vérificateurs to lay informations against them, and in support of this view have appealed to Art. 7 of the first part of the law of 4 June 1837, which only empowers the vérificateurs to lay informations of offences to which No. 5 of Art. 477 of the Penal Code is applicable, this article being now repealed.

That the Minister of Justice, who has been consulted, is of opinion that the vérificateurs have given too limited a construction to the word "offence" (*contravention*) used in the law of 4 July 1837, and remarks that unless the term "police offence" (*contravention de police*) is used, the word taken in an absolute sense signifies in effect infraction or breach of the law. Thus, as Art. 7 of this law has empowered the vérificateurs to lay informations (*constater*) of offences against the laws and the regulations of the Metric system, it has been the intention of the Legislature to impose upon them the duty of informing against any breach of these laws, without reference to the penalty which may be inflicted.

In this case there is no question of setting aside the principle by which special officers only are empowered to inquire into and lay informations of certain facts entrusted to their supervision. All that is to be dealt with is the maintenance of their right of inquiring into these facts, and proving them by verbal evidence, without regard to the modification made by law in the penalty.

Vérificateurs should therefore consider it to be within the limits of their functions that they are charged with the duty of carrying into effect the new law, without regarding the difficulty which has been raised. The préfets are therefore requested to make known the preceding decisions, and to see that the course indicated be exactly followed.

Regulatio
of special
weights u
by post
offices.

25 November 1852.—Recites, that in order to simplify and facilitate operations, the Post Office department has continued to use special weights of the denomination of the weight of letters specified by law.

The result of a correspondence in 1840 between the Finance department and that of Commerce was an agreement that the use of these special post-office weights should be continued, but only on sufferance, and as a ready means of ascertaining the weight of despatches, and upon condition that these weights should not bear the Government stamp, nor be subject to original or periodical verification; that they do not represent either the forms or denominations prescribed by the Ordonnance of 16 June 1839, so as to be assimilated to or confounded with legal weights; in fine, that the post offices, notwithstanding their being allowed the use of these special weights, should be provided with a set of weights marked with the Government stamp, so that under any circumstances they might have recourse to them on demand of a third party.

This arrangement not having been notified to all the vérificateurs, it has appeared to be requisite to bring it to their knowledge, and the préfets are requested to instruct them accordingly.

Further
regulating
wooden
measures
dry com-
modities,
and tin-pl
measures
liquids.

27 November 1852.—Recites that from the date of the Ordonnance of 16 June 1839, all wooden measures of capacity for dry commodities were to be made of oak. On the other hand, tin plate could be employed only in the construction of measures specially for milk, and up to the double litre.

That manufacturers in departments where oak is scarce having asked permission to construct measures of capacity of other woods, and other manufacturers in the southern parts of France where tin-plate measures have long been in use as vessels for oil and alcohol, having claimed that this practice should be duly authorized, the Government is of opinion, in concurrence with the Consulting Committee of Arts and Manu-

factures and the Council of State, that it may without public inconvenience be allowed,

1. To use walnut or beech wood either in thin sheets or in solid pieces, for constructing measures of capacity, provided that they fulfil the conditions of accuracy required ;

2. To construct measures of tin plate of larger capacity than the double litre, and also for other liquids besides milk, on condition of using only tin plate known in the trade as *five*, *four*, or *three cross*, the last being the thinnest tin plate allowed.

A decree of the President of the Republic in the Council of State, to carry out these objects, dated 5 November 1852, and bearing the signature of the Prince President, countersigned by the Minister of the Interior, is annexed to this Circular. This decree confirms all the other regulations in the Royal Ordonnance of 16 June 1839, and the instructions annexed to it. The new measures of capacity now authorized should, therefore, be constructed not only of the stipulated dimensions and strength, but also so as to afford security for the requisite solidity and accuracy. The tin-plate measures in particular should be provided with a strengthening rim or hoop at the top and the bottom, as well as the middle, and the thickness of the metal should not be less than $\frac{7}{10}$th of a millimètre.

The préfets are requested to transmit a copy of these instructions to every vérificateur in their departments, in order that they be duly carried out in the several arrondissements ; and also to make them known to the manufacturers.

Copy of Decree of President of Republic, 5 November 1852.

DÉCRET, 5 NOVEMBRE 1852.

AU NOM DU PEUPLE FRANÇAIS.

LOUIS NAPOLÉON, PRÉSIDENT DE LA RÉPUBLIQUE FRANÇAISE.

Sur le rapport du Ministre de l'Intérieur, de l'Agriculture, et du Commerce ;

Vu la loi du 4 juillet 1837 ;

Vu l'article 12 de l'ordonnance du 17 avril 1839 ;

Vu l'ordonnance du 16 juin 1839, et les tableaux Nos. 2 et 3 y annexés ;

Vu l'avis du comité consultatif des arts et manufactures ;

Le conseil d'Etat entendu,

DÉCRÈTE :

Article 1er. A l'avenir, les bois de noyer ou de hêtre pourront être employés, ainsi que le bois de chêne, pour la fabrication, en feuilles ou éclisses, des mesures de capacité destinées au mesurage des matières sèches.

2. Les mesures de capacité pour les liquides notamment pour les huiles et l'alcohol, pourront être établies en fer-blanc, mais exclusivement avec celui qui est connu dans le commerce sous la dénomination de, cinq, de quatre, ou de trois croix.

3. Il n'est pas dérogé aux dispositions des tableaux et des instructions annexés à l'ordonnance du 16 juin 1839, en ce qui concerne soit les mesures pour le lait, soit la forme, les dimensions et les autres garanties que doivent présenter les mesures de capacité mentionnées au présent décret.

4. Le Ministre de l'Iintérieur, de l'Agriculture, et du Commerce est chargé de l'éxécution du présent décret, qui sera inséré au *Bulletin des lois*.

Fait au Palais des Tuileries le 5 novembre 1852.

Signé LOUIS NAPOLÉON.

Par le Prince Président ;

Le Ministre de l'Intérieur, de l'Agriculture, et du Commerce,

Signé F. DE PERSIGNY.

Authoritative construction of preceding decree and circular.

18 March 1853.—Recites the last-mentioned decree of 5 November 1852, modifying to some extent the provisions of the Ordonnance of 16 June 1839, and authorizing on specified conditions the construction and use for trade purposes of certain tin-plate measures of capacity ; and that it has been construed by some vérificateurs as requiring that tin-plate measures of a dékalitre or a demi-dékalitre should be made precisely similar to those of iron plate, and as allowing the construction of these large tin-plate measures with a rim and a spout in order to facilitate their being moved, and the pouring out of their contents.

The Government sees no reason for refusing to measures made of tin plates what the regulations allow to pewter measures, the spout being also an appendage which does not interfere with the accuracy of the measure. An opinion to this effect has already been given by the Consulting Committee of Arts and Manufactures in the case of the form of covers of pewter measures.

There appears, therefore, no ground for refusing authority to verify and stamp measures so constructed, provided that the regulation form of the body of the measure be strictly adhered to, and that their legal contents be, if necessary, proved with the gauge.

On the other hand, some vérificateurs have thought that they were compelled to refuse to stamp wooden measures of capacity, from the hectolitre to the dékalitre inclusive, when they were not furnished with iron frames.

Such a compulsory provision is not to be found in the Instruction No. 3, of the Ordonnance of 16 June 1839, which only provides that according to the intended use of these measures, bands or hoops *may be* placed inside, or they may have iron frames fitted on with screws and nuts ; they may also have either iron or wooden feet and single handles.

The result of this condition is that the additions referred to in the instruction are arbitrary, and that officers of verification are empowered to admit such measures, but should abstain from insisting upon their being so constructed.

The préfets are requested to acquaint the vérificateurs in their departments with these views of the Government, as well as those manufacturers and traders subject to periodical verification, who from the nature of their business may have dealings in the large tin-plate measures orwooden measures in question.

As to the minimum number of weighing machines to be kept at railway stations.

22 June 1853.—Recites that in departments where there are railways, different constructions have been placed upon the provisions of the Ordonnance of 1825, with reference to the minimum assortment of weighing machines to be kept at railway stations, as well as the charges payable upon them.

In some departments, railway stations are not considered to be places where the weights and measures are subject to periodical verification. In others a certain number of large balances and a proportionate number of iron 20 kilogram weights have been required to be kept at these stations. Again, in other departments, one or two weighing machines only are set down in the list to be kept.

This mode of proceeding, and the corresponding difference in the fees chargeable, having given rise to well-founded complaints, it appears necessary to direct a uniform practice in this portion of the service, and with this view it has been decided that all railway stations should henceforth be duly provided with weighing machines, and the weights necessary for their use.

If at any railway station there are several places where it is the common practice to weigh baggage or merchandize, both on the arrival and departure of trains, a weighing machine or balance, complete with weights, should be provided for each place. The number of such weighing machines or balances is to be fixed by an order of the préfet, in pursuance of Art. 15 of the Ordonnance of 17 April 1839, and as soon as this order is published, an abstract should be transmitted to the Ministry of Commerce.

As for the fees to be charged, they should be in accordance with the tariff annexed to the Ordonnance of 18 December 1832, modified by that of 21 December 1832.

It may be desirable that the préfets should take this opportunity of considering whether, on account of the increase of trade and progress of industry, it may not be expedient to revise the order which fixes in each department the list of traders subject to periodical verification of their weights and measures,

as well as the minimum number of such instruments required to be kept by them.

In the event of this revision being judged advisable, it would be expedient, before carrying it into effect, that the préfets should be provided with all the requisite information to enable them to reconcile the interests of trade with those of the Treasury. It may be left to the préfets to consider whether it may not be proper to consult upon this point with the Chambers of Commerce and of Manufactures in their several departments. And they are requested to report to the Minister of Commerce what steps they may take with reference to this communication.

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8 June 1854.—Recites the preceding Circular of 22 June 1853. and that since those instructions were issued, it has been admitted that in order to prevent complaints from railway companies, and to maintain, as far as possible, requisite uniformity in decisions, it would be expedient, before the orders of the préfets are issued, that they should consult the chief engineers who have the execution of railway works under their control, and should even call for any remarks from the companies interested. In the event of any dispute arising, it would be well to refer the matter to the Minister of Commerce. When the orders are definitely determined upon by the préfets, they should be notified, not to the station-masters, who are hardly in a position to receive official communications of this nature, but to the directors themselves, the responsible heads of these companies.

The préfets are accordingly requested to conform to these additional instructions, and to acknowledge their receipt.

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5 August 1854.—Recites § 3 annexed to the Ordinance of 16 June 1839, for determining the form and dimensions of tinned measures for milk, according to which these measures might be provided either with a handle or a hook of tin plate. It would appear, however, from the drawings in the *Atlas*, issued with the official instructions, that litres and double litres should have a handle, and that only measures under a litre were allowed to have a hook.

As handles and hooks are only appendages, which neither modify nor alter the form and dimensions of measures, there can be no public inconvenience in allowing tinned measures for milk of a litre or a double litre, like smaller measures, to have either handles or hooks, and both should henceforth be admitted for verification. This decision rests on the same principle upon which other measures with spouts and covers have been allowed, in accordance with the advice of the Consulting Committee of Arts and Manufactures.

The préfets are requested to transmit a copy of this Circular to the vérificateurs in their several departments for their guidance.

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22 May 1855.—Recites that numerous complaints have been addressed to the Government on the faulty construction of balances used in trade, called *Roberval* balances.

These balances are, in fact, frequently defective, when issued for trade purposes, and may consequently lead to fraud or error; on this ground it has been proposed to prohibit them. On the other hand, they are easily used, and are very generally employed in trade. On the whole, it appears better than instead of altogether prohibiting them, the Government should merely take the necessary steps for improving the construction of these balances.

With this object, and in order to guarantee to the public the requisite conditions of accuracy, solidity, and durability, it will be proper to establish the following regulations, which have been adopted upon the advice of the Consulting Committee of Arts and Manufactures.

From 1 January 1856, the knife edges and bearings of *Roberval* balances should be of cast steel, or at least of good steel, tempered and polished; the beams of wrought, not cast, iron, and of sufficient strength to carry the stated weight; the oscillations should be perfectly regular whenever the weights may be placed in the pans. In order to satisfy themselves that these conditions are complied with, the vérificateurs will try the balances by placing the weights upon different parts of the pans; during the oscillations the beams should move freely, without any friction, which would make the balance sluggish after some days' use; the index needles should project well out, and be quite detached from any part which could screen them from the eye of the observer; the maximum weight the balances are made to carry should be inscribed on the pedestal. In fact these balances should be solidly and properly constructed, and should unite all the conditions prescribed by the Instruction No. 10, annexed to the Ordonnance of 16 June 1839.

As soon as the préfets shall receive this Circular, it will be proper to warn manufacturers that it is the intention of the Government to require that the construction of the Roberval balances be in every way unobjectionable.

In future the vérificateurs will pass as verified only those balances which are in accordance with the above regulations, and will reject those which are ill-constructed and do not offer a sufficient guarantee of solidity and durability. In their periodical visits and inspection, these officers will also satisfy themselves that these instruments are accurate and true, and will deal strictly with those found defective. They should, nevertheless, not act harshly in the first instance with the persons in whose possession they are found, if there is reason to believe they have no fraudulent intention, and they should content themselves with requiring the faulty balances to be replaced with others properly constructed, warning the persons that another time their defective balances will be seized and themselves prosecuted.

By these regulations, dealers may be protected against badly constructed balances, and it is to be hoped that within a short space of time the object of the Government may be attained.

Some further instructions are also required. In future the beams of balances should not have a stud for the Government stamp to be impressed upon it. The stamp of verification should be impressed upon one of the arms, and as nearly as possible in the centre of the beam. When balances are delivered for verification, quite finished and polished, a place should be reserved for receiving the impression of the stamp.

With regard to balances and large steelyards (*Romaines bascules*), the stamp should not be impressed upon the flat part, which, according to instructions No. 10, is intended to be marked with the maximum weight the balance will carry. The Government stamp should also be impressed upon the arm of these balances.

Lastly, vérificateurs should use no stamp but No. 5 for *Roberval* balances, and No. 4 for the large weighing machines, and should take every precaution to avoid damaging the beam.

As manufacturers of, and dealers in, weighing instruments, as well as retail traders, are much interested in being made acquainted with the preceding regulations, the préfets are requested to give them the utmost publicity. And so far as concerns the vérificateurs, a copy of this Circular should be sent to everyone by the préfets, who should direct them to conform strictly to the instructions contained in it, and should watch attentively that they are duly carried out.

Condition
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25 August 1855.—Recites that in the course of the year 1854 statements were made from various quarters to the Ministry of Commerce of the improper use of large weighing machines (*balances bascules*) with a *rectangular platform resting upon three points of support*, and instructions were accordingly issued, directing vérificateurs of weights and measures, in those departments where this abuse appeared to have been introduced, thenceforth to abstain from stamping weighing machines of this kind. This injunction was in conformity with the opinion of the Consulting Committee of Arts and Manufactures, who on several occasions had declared these weighing machines with

a square platform resting upon three points to be defective and contrary to the established regulations.

No authority had, in fact, been given by the Government to allow such weighing machines to be stamped. The *Quintenz* weighing machine, with three points of support, approved in 1827, had a platform in the form of a trapezium, and Béranger's machine, adopted at a later period with a rectangular platform, had four points of support. Since 1827, however, the manufacturers of Quintenz weighing machines, in order to facilitate weighings, substituted, without special authority, a square for a rectangular platform ; by this course, these weighing machines would come under the prohibition contained in the instruction of 1854, and a large number of persons, in whose possession they were, might thus, without any fault of their own, find their interests compromised. This consideration has raised the question whether, as regards the *Quintenz* weighing machine, the new form of the platform has affected the accuracy of the balance, or whether, as has been alleged on the other side, the change has had no injurious effect. After a careful inquiry, the Consulting Committee of Arts and Manufactures have declared in favour of the latter solution. They admit that the system of levers and knife edges supporting the platform of the *Quintenz* weighing machine forms an isosceles triangle, and that the shorter side of the trapezium, being of sufficient length, it would take but little addition to the two sides to form a square. In short, that the change in the form of the platform has not sensibly modified the accuracy of the instrument to such an extent that any complaint could fairly be made against its use for trade purposes.

The Committee has consequently declared that it may, without public inconvenience, be allowed to admit for verification a *Quintenz* weighing machine, having a straight beam placed in the direction of the length of the platform, with a pan for the weights, or with a steelyard or lever balance ; *the platform being in the form of a trapezium or square, and resting upon three points of support, in the figure of an isosceles triangle.*

This weighing machine, and the Béranger machine with a lever balance, or a beam carrying a weight placed on it, and with a square platform resting upon four points of support, are the only two kinds hitherto permitted. In the opinion of the Committee they answer all the requirements of trade, and it might lead to grave inconvenience to multiply uselessly the different kinds of balances. The Committee particularly insist, in order that both descriptions of weighing machines may be carefully made, that they accord with the conditions imposed with respect to the models sent for inspection, when the permission to verify and stamp these machines was originally granted, viz.:—

1. That the strength of the lever be in proportion to the maximum weight to be borne upon the balance ;

2. That the knife edges and bearings be of tempered steel ;

3. And finally, that the machines presented for verification agree in every other point with the requirements of the established regulations.

In adopting the opinion of the Committee, the Government have consequently to request that the préfets will particularly enjoin upon the vérificateurs in their several departments, while sending them a copy of this Circular, to pay the greatest attention in examining the Quintenz and Béranger weighing machines henceforth presented to them for verification, in order to secure that they are duly constructed. They should also communicate the contents of this Circular to the manufacturers of and dealers in weighing machines, so that for their own interest they may pay attention to its provisions. It should, however, be understood that notwithstanding what has been stated of the possible inconvenience of increasing the number of different kinds of weighing machines, any ingenious improvements in the construction of weighing machines that may henceforth be proposed will be considered with all the attention and impartiality that inventors have a right to expect, the duty of the Government in such circumstances being, on the one hand, to protect trade and the public against badly constructed instruments, and, on the other hand, to encourage the production of such machines as are more perfect and useful.

Modification of Circular of 22 May 1855 relating to Roberval balances.

15 October 1855.—Recites, that the Circular of 22 May 1855, relating to the construction and verification of *Roberval* balances, having given rise to some observations, it has been considered necessary, after having again referred to the Consulting Committee of Arts and Manufactures, to modify the principal regulations as follows :—

1. From 1 January 1856, the knife edges and bearings of *Roberval* balances should be constructed of steel tempered and polished, all the other parts subject to friction being of tempered steel.

2. The beams and other parts put in motion should be in preference of wrought iron ; but they may be made of cast-iron provided the material is sufficiently malleable to receive the impression of the stamp of verification. Balances which do not satisfy this essential condition should be rejected. The beams should have sufficient strength for the weight which the balance is constructed to carry. This maximum weight should be marked upon the pedestal.

3. The balances should be quite finished when presented for verification. If varnished, a clear space for affixing the stamp should be reserved on one of the arms, and as near as possible to the centre of the beam.

The other prescriptions and recommendations contained in the Circular of 22 May, are in other respects to be observed. The préfets are requested immediately to inform manufacturers and dealers in such instruments, as well as retail traders, of the preceding new provisions, and to transmit a copy of these instructions to every vérificateur of weights and measures in their departments. It is possible that on some points their application may not be exempt from difficulties, but it is the duty of public officers to endeavour to overcome any such by their experience, intelligence, and zeal.

Legal construction of provision for verifying tinned measures of capacity for liquids.

25 May 1856.—Recites that by the Ordonnance of 16 June 1839, and the instructions annexed, tin plate could not be used for constructing measures of capacity for any liquids but milk, and only up to the double litre. The decree of 5 November 1852, which was brought under the consideration of the Council of State, whilst continuing these particular measures used in the milk trade, authorized the use of tin plate known by the description of *five, four, or three cross,* for constructing liquid measures generally, and especially those for oils and alcohol.

This decree is still in force ; no other restriction is contained in its provisions, except that the tinned measures authorized are in accordance with the form and dimensions, and afford the guarantees required by the existing regulations.

The Government circular of 27 November 1852, to the printed form of which the last-mentioned decree was annexed, has, however, raised some doubt in the minds of several vérificateurs. Without paying due attention to the formal terms of the decree, these officers have placed this construction on the Circular, that tinned measures exceeding the double litre should be allowed only for measuring other liquids than milk. This is not the true construction, although the letter of the Circular may appear to bear it. The spirit of the instructions so given, agreeing with the terms of the decree, is to this effect, that such tinned measures may be received for verification, *even exceeding the double litre,* and consequently including those of smaller capacity, provided that they agree with the conditions as to form, solidity, wholesomeness, and precision required by the regulations.

An official reply to this effect has already been given to several different applications upon this subject

from the several departments where the doubt has been raised.

The préfets are requested to transmit a copy of this Circular to each of the vérificateurs of weights and measures in their departments. These officers should not forget that the tinned measures referred to should, by the terms of the Circular of 7 November 1852, be provided with a strengthening hoop at the top, the middle, and the bottom, and that the thickness of the metal used in their construction should not be less than 0·7 millimetre. The vérificateurs should well understand that they are to refuse to stamp all measures which, from their faulty construction, fail to fulfil the conditions required.

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5 June 1856.—Recites that it is laid down in the Instruction No. 3, annexed to the Ordonnance of 16 June 1839, that large wooden measures should be made of a twofold thickness.

In spite of this provision, some vérificateurs, and particularly those of the central standard office of Paris, judging by the mode of construction adopted for the models deposited at the offices for verification, have considered that they might admit for verification large dry measures made of a single thickness of wood, if in other respects they appeared to be sufficiently strong.

This departure from the precise regulation having given rise to some remarks, the matter was referred to the Consulting Committee of Arts and Manufactures, and the result of the opinion they have expressed is that the Government have decided that in future large wooden measures may be made of a single thickness in conformity with the models deposited in the offices of verification, A double thickness will be required only for the hectolitre and the half hectolitre on legs, which are specially intended for measuring charcoal or wood, peat, and lime, and for the double hectolitre, resting on its bottom or on legs.

The other provisions of the above instruction No. 3 will continue in force, and the préfets are requested to transmit a copy of this Circular to every vérificateur in their departments.

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25 October 1856.—Recites that by the regulations hitherto in force, wooden measures are allowed to be made of oak, beech, and walnut. It has been recently admitted that chestnut wood is also a proper material for constructing these measures.

Consequently, and in accordance with the opinion of the Consulting Committee of Arts and Manufactures, a decree of the Council of State (dated 3 October 1856, signed by the Emperor and countersigned by the Minister of Commerce, and appended to this circular), authorizes the use of chestnut wood as well as oak, beech, and walnut, for constructing dry wooden measures of capacity. In admitting these new measures to verification and stamping, it is to be understood that they are to be subject to all the other conditions prescribed by the Ordonnance of 16 June 1839.

The préfets are requested to transmit a copy of this Circular to every vérificateur in their departments, for their guidance, and to bring it also to the notice of the manufacturers within their districts.

DÉCRET 3 OCTOBRE 1856.

NAPOLÉON PAR LA GRACE DE DIEU ET LA VOLONTÉ NATIONALE, EMPÉREUR DES FRANÇAIS ;

A tous présents et à venir, *Salut.*

Sur le rapport de notre ministre Secrétaire d'Etat au Département de l'Agriculture, du Commerce, et des Travaux publics ;

Vu la loi du 4 juillet 1837 ;

Vu l'article 12 de l'ordonnance du 17 avril 1839 ;

Vu l'article 1er de l'ordonnance du 16 juin 1839 et le tableau y annexé ;

Vu le décret du 5 novembre 1852 ;

Vu l'avis du comité consultatif des arts et manufactures ;

Notre conseil d'état entendu,

Avons décrété et décrétons ce qui suit ;

Art. 1er. A partir de la promulgation du présent décret, le bois de châtaigner pourra être employé, concurremment avec les bois de chêne, de hêtre et de noyer, à la fabrication, en feuilles ou éclisses, des mesures de capacité pour les matières sèches.

2. Notre ministre Secrétaire d'Etat au Département de l'Agriculture, du Commerce, et des Travaux publics est chargé de l'éxécution du présent décret, qui sera inséré au *Bulletin des Lois.*

Fait au palais de St. Cloud, le 3 octobre 1856.

Signé NAPOLÉON,

Par l'Empéreur :

Le Ministre Secrétaire d'Etat au Departement de l'Agriculture, du Commerce, et des Travaux publics ;

Signé E. ROUHER.

Prohibiting bottles marked as holding a specified Metric quantity.

10 November 1856.—Recites that applications have been made to the Government from several quarters, relating to bottles used in the sale of drinks, many of the préfets having considered that the use of such bottles, marked as holding a litre, half litre, &c., ought not to be allowed.*

If such applications were disregarded, it would appear that the Government had in fact admitted the legality of vessels the contents of which are always uncertain, and which, not being Metric measures, should, on the contrary, be absolutely forbidden under Articles 3 and 4 of the law of 4 July 1837, and Articles 12 and 35 of the Royal Ordonnance of 17 April 1839.

As to ordinary bottles of no specified capacity, they may be continued in use as vessels for holding liquids, conformably to Article 32 of the Ordonnance. But it is of importance that the public should be informed that no one is compelled to accept them as holding any specified quantity.

It would, therefore, appear to be expedient that a public notice should be issued by the préfets, the placarding of which in places where beverages are sold might even be made compulsory ; such notice to prescribe to the sellers,—

1. That they should remove from their place of business within a specified time, and on pain of seizure and prosecution, every bottle indicating by any mark whatever that it holds any specified Metric quantity.

2. That they should make use of the legal measures, with which they are bound to provide themselves, for measuring every Metric quantity of a beverage which may be asked for by a purchaser.

The préfets are requested to furnish the Minister of Commerce with a copy of any notice issued pursuant to these instructions.

Weight carried by weighing machines to be securely marked upon them.

30 July 1857.—Recites § No. 6 annexed to the Royal Ordonnance of 16 June 1839, providing that a brass plate, fixed on large weighing machines, shall indicate the weight they will bear.

This provision has given rise to irregularities. It allows, in fact, unscrupulous manufacturers and traders to remove the plate of a weighing machine and replace it upon another carrying a less weight, and thus to deceive the purchaser as to the real weight it will bear, and, consequently, the accuracy of the weighing machine sold to him.

It is fit that this abuse should be stopped, and by an Imperial decree hereunto annexed (bearing the signature of the Emperor under the date of 14 July 1857), it has been ordered that from 1 October 1857 the weight which large weighing machines when first presented for verification will bear shall be either engraved, or raised in relief when cast, on the polished surface of one of the sides of the beam, and exposed to view. Hitherto, the beams of large weighing machines appear to have been constructed almost exclusively of wrought iron. Beams of cast iron should not be allowed, except they show from their malleability and finish all the requisite evidence of solidity.

The préfets are requested to transmit to the vérificateurs in their departments a copy of this Circular,

* This opinion is not meant to apply to vessels or bottles marked as holding a litre or demi-litre at least. These words would afford some security to the public, and prevent any confusion between such vessels and measures properly so called.

that they may secure the proper carrying out of the annexed Decree, and also to notify these new regulations to all manufacturers and sellers of weighing machines whom they may concern.

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DÉCRET 14 JUILLET 1857.

NAPOLÉON PAR LA GRACE DE DIEU ET LA VOLONTÉ NATIONALE EMPÉREUR DES FRANÇAIS ;

A tous présents et à venir, *Salut.*

Sur le rapport de notre ministre Secrétaire d'Etat au Département de l'Agriculture, du Commerce, et des Travaux publics ;

Vu l'article 8 de la loi du 4 juillet 1837, l'article 12 de l'ordonnance du 17 avril 1839, l'article 1er de l'ordonnance du 16 juin 1839, et le tableau n° 6 y annexé ;

Vu le rapport de notre ministre Secrétaire d'Etat au Département de l'Agriculture, du Commerce, et des Travaux publics ;

Considérant que l'indication de la portée des balances-bascules sur une plaque mobile donne lieu à des abus ;

Notre conseil d'etat entendu,

Avons décrété et décrétons ce qui suit ;

Art. 1er. A partir du 1er octobre 1857 l'indication de la portée des balances-bascules qui seront présentées à la vèrification première sera, ou gravée en creux, ou produite en relief dans l'opération de la fonte, sur le plat poli d'une des faces latéral du fléau extérieur.

2. Notre ministre Sécrétaire d'Etat au Département de l'Agriculture, du Commerce, et des Travaux publics est chargé de l'éxécution du présent décret, qui sera inséré au *Bulletin des Lois.*

Fait à Plombières, le 14 juillet 1857.

Signé NAPOLÉON,

Par l'Empéreur :

Le Ministre Secrétaire d'Etat au Département de l'Agriculture, du Commerce, et des Travaux publics.

Signé E. ROUHER.

Authorizing the largest wooden measures of capacity to be made of a single thickness of wood.

18 November 1857.—Recites the Government Circular of 5 June 1856, informing the préfets, that on the advice of the Consulting Committee of Arts and Manufactures, the construction of wooden measures of capacity of a single thickness of sliced wood was allowed, and that only the larger measures should continue to be made of a double thickness.

The latter regulation has given rise to some remonstrances upon the subject to the Government. Traders and warehousemen have declared that such large measures are very heavy, and in spite of the double thickness of the wood, being bound only with thin iron hoops, they are subject to variation. They have asked that manufacturers may, if they think fit, make these large measures of a single thickness of wood, on condition that they strengthen them, both outside and inside, with hoops of sheet iron riveted, and fix on the top a flat edge of iron ·012 millimètre thick.

Models of measures thus made having been submitted to the Consulting Committee of Arts and Manufactures, they have been considered as well constructed, and the Committee have declared that, in fact, they afford every security of sufficient solidity, and measures similar to the models may properly be verified and stamped, if they fulfil all the other prescribed conditions.

Upon this opinion, the Minister of Commerce has decided that henceforth wooden measures of capacity exceeding the half hectolitre may be made of a single thickness of wood, on the express condition that they be strengthened with iron in the mode stated. In all other respects the prescribed regulations of the instruction No. 3 annexed to the Royal Ordonnance of 16 June 1839, will remain in force.

A copy of the circular to be sent by the préfet of every vérificateur.

Authorizing [illegible] M. [illegible]'s new [illegible] weights.

1 February 1858.—Recites that M. Moulin, a scale-maker at Neufchâteau, Vosges, has submitted a model of a newly constructed weight in cast iron, which he asks to be allowed to have verified and stamped. The following is the result of an examination made by the Consulting Committee of Arts and Manufactures.

To avoid any inconvenience which might result from the mode of fixing the rings and their staples to weights when cast, M. Moulin drills a hole, which is countersunk underneath, through the centre of the hollow left in the casting, in order that the staple of the ring may be passed through and secured by being firmly riveted.

The hollow to receive the lead is formed, as is shown in the accompanying drawing, in the shape of two truncated pyramids, joined at the small ends ; so that the lead runs into the upper part, and when hammered becomes securely fixed.

The Committee having found this mode of construction a great improvement on that hitherto used, and that it involves no alteration in the material and shape of weights as directed by the existing regulations, are of opinion that these newly constructed weights may be admitted for verification and stamping, provided that in other respects they accord with the prescribed conditions.

The Minister of Commerce adopts this recommendation, and consequently informs the préfets that such weights constructed by M. Moulin, when found accurate and properly constructed, may be verified and stamped.

A sufficient number of copies and of M. Moulin's drawings is herewith transmitted, in order that they may be supplied to every office of verification in the several departments ; and the préfets are requested to acknowledge them and report that these instructions are duly carried out.

Preparatio of schedul of fees for verificatio

10 April 1858.—Recites that several irregularities in the schedules of fees for the verification of weights and measures have been reported by the Inspector General of Finance. Some of the schedules are drawn up in a compressed and incomplete form, the vérificateurs often specifying in them neither the class of traders, nor the trades exercised cumulatively, besides which there is considerable difference in the form of these schedules as prepared by these officers.

It is of importance that vérificateurs should have one uniform form for these papers, and especially in reference to the provisions of Articles 1 and 8 of the Royal Ordonnance of 21 December 1832.

The attention of the préfets is, therefore, particularly requested to this point, which affects not only the duties payable to the Treasury, but also the regularity of the service of verification, and the interests of persons subject to it.

The préfets being entrusted by Article 51 of the Ordonnance of 17 April 1839, with the responsible functions of charging and collecting the fees of periodical verification of weights and measures, they should see that in the different arrondissements of their préfecture the tariff is imposed uniformly on every trade, and in conformity with the table of minimum assortments drawn up by them. If this table appear to be not sufficiently clear, so that the vérificateurs can act upon it without hesitation or doubt, it should be revised, and drawn up so distinctly that these officers should never be under the necessity of deciding by analogy.

Under the existing state of things, certain public establishments are exempt, in some departments, from the payment of fees of verification, to which in other departments they are made liable. It is expedient that this discrepancy should be put an end to, by laying down as a rule that whenever any establishment is made use of by a government agent for his own private interest, this establishment should be considered not as a municipal office, but as a private commercial undertaking chargeable with the payment in question.

It has been before observed that it has become necessary to put a stop to diversities of interpretation of the provisions of Articles 1 and 8 of the Ordonnance of 21 December 1832.

Art. 1 provides that a reduction of one-tenth of the fee charged for the verification of weights and measures is allowed in those communes where the periodical verification is annual.

Art. 8, § 2, provides that this fee shall be reduced one-half for balances with equal arms. Some vérificateurs have considered that the half fee thus chargeable should be reduced one-tenth, as allowed by Art. 1; many others, on the contrary, charge the half of the whole fee.

Upon examining the letter and spirit of Article 8, it has been found that persons having balances of equal arms are not excluded from the benefit of the reduction of one-tenth, allowed to the possessors of all other instruments of weighing or measuring, in communes where the verification is annual. Such is also the opinion of the Minister of Finance, who has been consulted upon the subject.

The préfets are consequently informed that henceforth on charging the amount to be paid for balances with equal arms, in those communes where the verification is annual, one-half of the fee prescribed in the tariff of 1825 should be taken, and then one-tenth of this half fee deducted. Thus, for a warehouse balance, the fee fixed by the tariff being 50 centimes, half of this sum should be taken - = 25 centimes.
From which deduct one- tenth - 2·5 „

And the amount to be paid will be 22·5 „

The necessary instructions should therefore be given to the vérificateurs in each department, to act in conformity with all the directions of this Circular, a sufficient number of copies of which will be transmitted so that each vérificateur may be furnished with a copy.

Copper and its alloys may be used for strengthening wooden measures of capacity.

2 April 1860.—Recites instruction No. 3, annexed to the Ordonnance of 16 June 1839, for strengthening wooden measures of capacity with sheet or wrought iron, and a recent application from a manufacturer to have this instruction modified, and the use of copper or brass also authorized.

The Consulting Committee of Arts and Manufactures have given their opinion that this application should be acceded to. They have observed that the object of thus strengthening the wooden measures of capacity was to prevent the separation of their several component parts, and to guard their upper edge from wear, which might have the effect of more or less diminishing their capacity. This object may be effected as well by using copper and its alloys as sheet and wrought iron.

The Committee have considered also that, in a sanitary point of view, the poisonous qualities of the oxides of copper could not, in this instance, give cause for alarm, as wooden measures are used only for measuring dry goods, and their metallic adjuncts are liable only to the ordinary action of atmospheric air, the tendency of which is only to discolour the surface.

For these reasons, and in pursuance of the advice of the Committee, it has been decided that for the future the manufacturers of these measures may be allowed to use copper and its alloys, the same as sheet or wrought iron, for the purpose of strengthening them.

The préfets are requested to forward a copy of this circular to each vérificateur in their departments, that it may be duly carried into execution.

Measures of length made of steel ribbon to be admitted for verification.

10 June 1860.—Recites the application of a manufacturer, who has sent patterns of mètres and dékamètres made of steel ribbon, to have them admitted for verification.

This mode of construction has appeared to the Consulting Committee to afford all the requisite guarantees of solidity and accuracy, and to be preferable to the use of chains for dékamètres. It has consequently been decided that measures of length made of steel ribbon, whether rolled up or not in a box made for the purpose, should be admitted for verification and stamping, when they accord with the conditions of accuracy prescribed by the regulations.

As steel cannot well be impressed with the marks of verification except under peculiar conditions, the stamps of original and periodical verification are to be affixed in the brass handles, or on the joints between each mètre or dékamètre, upon the graduated steel by means of holes made with a proper instrument.

The préfets are requested to send a copy of the circular to each vérificateur in their department, that it may be duly carried out.

Authorizing wooden measures made of several thickness of veneer wood glued together.

20 May 1861.—Recites that a new pattern of wooden measures of capacity has been sent to the Government for inspection, the cylindrical body being constructed of several thicknesses of veneered wood glued together, instead of a single thickness of thin wood. And the Consulting Committee of Arts and Manufactures having examined this new pattern have considered that it affords all the advantages of those hitherto authorized.

It has therefore been decided that measures of this new pattern may be admitted for verification and stamping, provided they accord with the conditions of accuracy and solidity prescribed by the regulations.

Copies of drawings and a description of these new measures are herewith sent, to show their mode of construction, one of which should be sent to each vérificateur, together with a copy of this Circular.

Authorizing M. Béranger's peso mesureur, for the simultaneous weighing and measuring of grain.

15 November 1861.—Recites that an instrument called a *peso-mesureur* has been sent for inspection by a balance maker of Lyons, which has been referred to the Consulting Committee of Arts and Manufactures.

The Committee are of opinion that as thus constructed the apparatus may be usefully employed for the simultaneous weighing and measuring of grain. The Government, however, do not feel called upon to do more than to authorize the steelyard and litre, which form part of this *peso-mesureur*, to be stamped, when these instruments are ascertained to be in accordance with the regulations for their proper construction and accuracy. The other parts of the *peso-mesureur* are accessories only not recognized by law, and it is no part of the duty of the Government to determine their form and dimensions.

Drawings and a description of the *peso-mesureur* are herewith sent, and the préfets are requested to forward one copy to each vérificateur in their department, together with a copy of this circular, in order that these officers may be able to compare them with any of the new instruments, and the steelyard and litre duly stamped.

Authorizing measures capacity made of sheet iron tinned.

16 November 1861.—Recites the Imperial Decree of 5 November 1852, by which the use of tin plate, previously allowed to be used for milk measures, was extended also to all liquid measures of capacity, and the circular instructions of 27 November 1852 and 25 March 1856, founded on this Imperial Decree, and states that a Paris manufacturer has recently submitted the model of a measure made of sheet iron tinned, and the Consulting Committee of Arts and Manufactures has given their opinion in favour of the model, that it fulfils all the requisite conditions of solidity, and of not being injurious to the public health (*salubrité*).

It has consequently been decided that all liquid measures, including those intended for milk, may be made of sheet iron tinned, and admitted for verification and stamping when they are, in other respects, conformable to the regulations prescribed for their proper construction and accuracy.

The préfets are requested to acknowledge the receipt of this Circular, and to forward a copy to every vérificateur of weights and measures in their several departments.

Authorizing M. Franc regulating syphon for liquid measures.

31 December 1861.—Recites that M. Franc, of Carcassone, has submitted the model of a measure of capacity provided with a regulating syphon, and has applied for its admission for verification and stamping.

The Consulting Committee of Arts and Manufactures, to whom this measure has been referred for examination, have admitted that this regulating syphon is a real improvement, and that for this reason the increased height of the apparatus ought to be no obstacle to its verification and stamping, providing that in constructing it the due proportion of the diameter is observed, and that the regulation height is

marked both outside and inside the measure by a definitive line.

Under this condition the admission of the measures in question for verification and stamping has been consequently authorized, as they appear calculated to be of real service in the trade of liquids.

Drawings of this apparatus are herewith transmitted, and the préfets are requested to forward a copy of the drawings, as well as of this Circular, to each vérificateur in the departments. They are also requested to acknowledge the receipt of this Circular.

New mode of readjusting and stamping brass and ironweights.

15 July 1862.—Recites that the attention of the Government has been drawn to the mode of readjusting brass weights, and to certain inconveniences resulting on the one hand from the practice of readjusting these weights, and on the other hand from the mode of constructing cast-iron weights.

That a modification proposed by M. Moulin, of Neufchâteau, has already been sanctioned so far as regards iron weights. Two new plans have also been submitted by M. Dosse, of Paris, one for constructing iron weights, the other for facilitating the readjustment of brass weights having a knob. The objects of the latter are :—1. To remedy the inconvenience of the accumulation of annual letter stamps upon the upper surface of brass weights, consequent on successive reverifications. 2. To preserve untouched the stamp of original verification in the process of readjustment.

The method proposed consists in having a pin made of pewter to fill a cylindrical hole perforated in a groove on the upper plane surface of the weight, opposite the stamp of original verification.

When a weight has to be readjusted, the pin is driven out with a punch, or it is bored with a drill bow, and its readjustment is effected by adding sufficient metal to the hole, allowing for the weight of the new pin, which, when made flush with the surface, is to receive the impression of the annual stamp, and so on successively for other periodical reverifications, by which means the letter of the current year is substituted for that of the preceding year.

This plan is applicable to the existing brass weights from 20 kilog. to 200 grm. inclusive. As the weights from the hectogramme down to the gramme ought to be solid, according to instruction No. 8 of the General Collection of Official Instructions, the pin to be used with them should be placed in a different part of the weight, that is to say, underneath it, in a hole made in a similar manner to that already described.

As for iron weights, M. Dosse's method is applicable only to those hereafter to be made.

His weights are made of a single casting, and hollow in the inside. The ring is not confined to its place by a staple with the ends bent round, but by an iron bolt passing through the axis of the weight; this bolt is squared at its upper part, and held at its lower end in a hole made for this purpose by a screw nut fixed securely with pewter. This pewter is to receive the stamp of original verification and that of the maker.

The marks of periodical reverification and the readjustments are made in the same manner as in iron weights, by means of a pin filling a hole drilled on the upper surface round the ring.

Upon the advice of the Consulting Committee of Arts and Manufactures, the Minister of Commerce, &c. has authorized the admission of all weights constructed or readjusted according to the mode thus described. They may consequently be verified and stamped, provided that in other respects they fulfil the requisite conditions of accuracy, of dimensions, and of proper construction, as prescribed by the regulations.

The préfets will receive herewith drawings of iron weights constructed according to M. Dosse's method, and showing his mode of readjusting brass weights. They are requested to transmit a copy of each drawing to every bureau de vérification in their departments, as well as a copy of this Circular, the receipt of which they will acknowledge.

Tin-plate measures with pewter rims and bottoms, and with moveable rims.

12 August 1862.—Recites that M. Giovanna, pewterer at Apt, has submitted the following models :—

1. Tin-plate measures, with the bottom and upper rim of pewter.

2. Large tin-plate measures, to which moveable rims are fitted.

The Consulting Committee of Arts and Manufactures has proposed that these two different descriptions of measures be admitted for verification and stamping, and the Government has acceded to this proposal. The measures in question are therefore to be stamped upon verification, when they are in conformity with the established regulations.

M. Giovanna's measures, the bottom and upper rim of which are of pewter, do not require any particular description; it may be sufficient here to state that on account of the greater solidity that they acquire from the pewter which forms part of them, the middle strengthening band prescribed by the circulars of 27 November 1852 and 5 May 1856 may be dispensed with.

As to the other measures, they differ only from the regulation measures by the ring fixed on the outside of their upper edge, which in no way alters either the dimensions or the form of the legal measure.

This ring is soldered at its lower part and left detached above, so as to form a narrow interstice or chink all round the top of the measure. This interstice is intended to receive another ring which is moveable ; it is somewhat larger in diameter than the measure, and its use is to prevent the spilling of the liquid contents when carried.

The moveable ring or collar, which has also a spout, is an accessory only, which, as it forms no part of the measure, should not receive any mark of verification nor stamp.

The préfets are requested to transmit a copy of this Circular to every bureau de vérification in their departments, and to acknowledge its receipt.

Penalties for Offences connected with Weights and Measures in France.

Offences connected with weights and measures punishable under the Penal Code of France.

The legal provisions for imposing penalties for offences connected with French weights and measures are to be found in the Penal Code of France.* The Penal Code of the empire established in 1810, and taking effect from 1 January 1811, together with its subsequent modifications, especially the law of 28 April 1832, is the general law in France which determines what are punishable offences and the penalties attached to them ; and it is completed by other supplemental laws. The Law of Criminal Procedure (*Code d'instruction criminelle*) is the general law for regulating the proceedings by which the Penal Code is put in force.

General provisions of the Penal Code.

The Penal Code divides offences against the law (*infractions*) into three classes, which have been thus defined :—

1. Those less grave offences without culpable intent, but only the result of imprudence or carelessness. These are considered as breaches of the law (*contraventions*).

2. Those acts committed with culpable intent, but not by hardened offenders, so that it may reasonably be expected that on correction they will be reclaimed. These offences are considered as misdemeanors, and are termed *Délits correctionnels*.

3. Acts constituting positive danger to society, and showing so much hardened guilt that it can hardly be expected that such offenders will be reclaimed. These offences are termed crimes (*crimes*).

(*Art.* 1. *du code pénal. L'infraction que les lois punissent de peine de simple police est une contravention ; l'infraction que les lois punissent de peines*

* Cours de Code Pénal, M. A. Bertauld, Paris, 1854, p. 140.

correctionelles est un délit; l'infraction que les lois punissent d'une peine afflictive ou infamante, est une crime.)

The two former classes only may be considered as involving offences connected with weights and measures, viz., minor offences visited with simple police punishment, and misdemeanors for which correctional punishment is imposed.

Simple police punishment is imprisonment in a house of detention for not less than one day (24 hours), or more than five days; a fine of not less than 1 or more than 15 fr.; and the confiscation of certain articles seized.

Correctional punishment is imprisonment in a house of correction for not less than six days; a fine of not less than 16 francs; confiscation of certain articles seized; and the temporary deprivation of certain civil and civic or domestic rights.

This deprivation is not necessarily imposed as part of the correctional punishment, and it must be specially authorized by law. The rights of which misdemeanants may thus be deprived are enumerated in Art. 42 of the Penal Code.

Penalties for Illegal, Fraudulent, or Defective Weights and Measures in France.

By the Penal Code of 25 September 1791,* the heavy penalty of four years' imprisonment in irons was pronounced against sellers using false or fraudulent weights and measures.

The Penal Code of 1810, whilst visiting with correctional punishment sellers using with fraudulent intent false or illegal weights or measures, inflicted the milder police punishment on those dealers in whose possession only false weights and measures were found, and imposed no penalty on the possession of prohibited weights or measures, or on either the posession or use of unstamped weights and measures.

The laws of 4 July 1837 and 17 April 1839 imposed penalties also upon these last-mentioned offences, and upon all persons having in their possession others than Metric weights and measures authorized by law.

These provisions having been found insufficient, penalties were imposed by the further provisions of the laws of 27 March 1851 and 13 May 1863, upon dealers acting in any way fraudulently, either as respects weights, measures, balances, or the quantity or quality of the article sold.

The following are the penalties to which offenders against the weights and measures laws are subject by the Penal Code of France :—

First, as to cumulative penalties on second convictions, generally applicable to graver offences.

Art. 57. If any person, who, upon conviction, shall have been sentenced to a higher punishment than one year's imprisonment, shall commit another, offence which shall subject him to fine and imprisonment only, he shall be sentenced to not less than the maximum punishment for such offence specified by law, and which may be increased to twice this punishment. He shall also be put under the special surveillance of the police for a period not less than five years or more than ten.

Art. 58. Imposes a similar cumulative punishment on offenders sentenced by the Correctional Tribunal to imprisonment for a period exceeding a year, who shall commit another offence subjecting them to fine and imprisonment.

Art. 142. All persons guilty of counterfeiting or attempting to counterfeit any government stamp, or knowingly using or attempting to use such, to be liable to imprisonment for not less than two years or more than five.

They may also be placed under surveillance of the police for a similar period. And may be deprived by the Correctional Tribunal of the following rights, specified in Art. 42, viz.:—

1. Of their electoral vote.
2. Of their electoral eligibility.
3. Of exercising the functions of juror, or of any government employment.

Or improperly possessing and using a government stamp.

Art. 143. Whoever shall become possessed of a genuine government stamp, and use it or attempt to use it to the prejudice of the rights or interest of the State or any government authority, shall be liable to imprisonment for not less than six months, or more than three years.

They may also be placed under the surveillance of the police for a similar period, and forfeit the rights specified in Art. 42, for not less than five years or more than 10.

Art. 163. Persons guilty of the above offences are also liable to a fine not less than 100 francs or more than 3,000. But the fine may be extended to one-fourth of the amount of the gain or the intended gain by means of the fraudulent offence.

For fraudulent dealings or fraud from using false weights and measures.

Art. 423. Whoever deceives a purchaser with respect to the nature of the article sold, or by using false weights or measures deceives him with respect to the quantity sold, is liable to imprisonment for not less than three months or more than one year, and to a fine not more than one-fourth of the amount defrauded and damages, but not less than 50 francs.

The articles which are the objects of the fraud, or their value, if they still belong to the seller, to be confiscated; the false weights and measures to be also confiscated and broken up.

The tribunal may order the sentence to be publicly posted up.

In dealings with illegal weights and measures, buyer to have no right of action against the seller.

Art. 424. If the seller and buyer make use in their dealings of weights and measures other than those authorized by law, the buyer shall lose all right of action against the seller who shall have defrauded him by the use of prohibited weights and measures; without prejudice to the public right of action for penalties not only for the fraud, but for using illegal weights and measures.

Extenuating circumstances.

Art. 463. The punishments awarded by law to persons found guilty, in whose favour the jury have declared there are extenuating circumstances, to be modified as follows :—

* * * * *

In all cases in which the Penal Code specifies a maximum punishment, if there are extenuating circumstances, the court shall award the minimum or even a less punishment.

In all cases where the Penal Code prescribes both fine and imprisonment, if there are extenuating circumstances, the correctional tribunals are authorized, even for second offences, to reduce the two penalties as follows :—

If the penalty prescribed by law, whether from the nature of the offence, or from the offender having been convicted before, is imprisonment for not less than a year, or a fine not less than 50 francs; the tribunal may reduce the imprisonment, so that in no case it be less than the penalties of a police court.

In every case they may reduce the punishment to even less than six days, and the fine to less than 16 francs. They may also pronounce for either one or the other of these penalties separately, and even substitute a fine for imprisonment, so that in no case it be less than the penalties of a police court.

Penalties for infringing regulations.

Art. 471. A fine from 1 franc to 50 francs inclusive is imposed for the offence of infringing regulations legally made by the administrative or municipal authorities.

Art. 474. Persons offending under Article 471 shall, in case of a second offence, always be punished by imprisonment for not more than three days.

Penalties for possessing or using false or illegal weights and measures.

Art. 479–482. Traders in possession of or using false weights and measures, or using weights and measures other than those authorized by law, are liable to a fine from 12 fr. to 15 fr. inclusive, without

* Barny, p. 222.

prejudice to sentence by the Tribunal of Correctional Police; they may also, according to circumstances, be imprisoned for not more than 5 days; and the false and illegal weights and measures may be seized and confiscated.

In case of a second conviction they shall always be imprisoned for 5 days.

Further penalties under Law of 27th March 1851.

The following penalties are imposed by the law of 27 March 1851, which also provides for punishing persons found guilty of adulterating articles of food, or medicines intended for sale.

Art. 1. The penalties of Article 423 of the Penal Code are extended to the following offences, viz.:—

Further penalties for fraudulent dealings, or attempts to defraud.

Fraud or attempt at fraud in the quantity of articles sold to or bought from persons, whether by the use of false weights and measures, or defective instruments for weighing or measuring, or by any proceeding tending to fraud in weighing or measuring, or by fraudulently increasing the weight or volume of articles, even previous to weighing or measuring, or, finally, by any fraudulent indication leading to the belief in the accuracy of a previous weighing or measuring.

Penalties increased for fraudulent dealings in adulterated articles.

Art. 2. If in the cases provided for by Art. 423 of the Penal Code, and Art. 1 as above, the articles in question contain adulterations injurious to health, the fine imposed shall be from 50 fr. to 500 fr. unless one-fourth part of the loss sustained and damages does not exceed this last sum; and the imprisonment from three months to two years. And this Article shall be applicable even in cases where the injurious adulteration may be known to the buyer or consumer.

Further penalties for possessing false or defective weights, &c. or adulterated articles.

Art. 3. A fine from 16 fr. to 25 fr., and imprisonment from 6 to 10 days, or either of these penalties, according to circumstances, is imposed upon all persons who, without lawful excuse, shall have in their shops or warehouses, or in halls, fairs, or markets, any false weight or measure, or other defective instruments for weighing or measuring, or any article of food or medicine which they know to be fraudulent or adulterated.

Double penalties on second convictions.

Art. 4. Any person convicted of infringing this law, or Art. 423 of the Penal Code, who shall during five years previously have been convicted of a similar offence, shall be liable to have the penalties doubled; without prejudice to the application, if called for, of Art. 57 and 58 of the Penal Code.

Confiscations on conviction.

Art. 5. The articles of which either the sale, use, or possession constitute the offence shall be confiscated, in accordance with Art. 423, 477, and 481 of the Penal Code.

If fit for use as food or medicine, they may be placed by the tribunal at the disposal of the administration for distribution to benevolent institutions.

If unfit for use, or hurtful, they shall be destroyed or thrown away, at the expense of the offender. The tribunal may order this to be done in front of the offender's place of business or residence.

Convictions to be publicly placarded.

Art. 6. The tribunal may order the sentence to be publicly posted in specified places, and the whole, or an extract, to be inserted in any specified newspapers, all at the expense of the offender.

Disposition of fines.

Art. 8. Two-thirds of the fines to be paid to the communes in which the offences were committed.

It is remarked by M. Barny (p. 235), that the object of the law of 27 March 1851 is to protect trade against fraud and injustice; and that the period which has since elapsed has proved that, through the strict application of this law, however severe it may appear, the desired object has been attained.

He draws attention more particularly to Art. 3 of this law, which extends the application of Art. 423 of the Penal Code to attempts at fraud in the quantity of the article dealt with.

Penalties extended by Law of 13 May 1863.

The provisions of the law of 27th March 1851 were extended by the law of 13th May 1863, which raised to the class of misdemeanors (*délits correctionels*) the possession without lawful excuse of fraudulent weights and measures, which is considered as primâ facie evidence of culpable intention.

Present Establishment of Officers of Weights and Measures in France.

Having thus described the primary and official standards, with the mode and periods of verification, as well as the local Metric standards, and shown in detail the laws and official regulations relating to the Metric system in France, and the penalties for offences connected with weights and measures, it may be desirable to add a brief statement of the present official establishment in that country for regulating the weights and measures, and matters relating to them.

Pres... tabli... of off... weigh... meas... Franc...

It has been stated that the chief department in France, under the authority of which the system of weights and measures is placed by law, is that of the Minister of Commerce, Agriculture, and Public Works. In framing his decrees for the regulation of this system, or drafts of bills for amending the laws, the minister is assisted by the Consulting Committee of Arts and Manufactures attached to his department, to whom points requiring consideration are from time to time referred by him.

Regul... of wei... and m... sures ... Franc... under... thorit... Minis... Comm... &c.

The Consulting Committee is composed of the following 14 members,* viz.:—

Assist... a perm... consu... comm...

Messrs. G. O. Chevreul, de l'Académie des Sciences, *Président.*
C. Duvergier, Président de Section au Conseil d'Etat.
De Lavanay, Conseiller d'Etat.
C. Regnault, de l'Académie des Sciences.
O. Amé, Administrateur des douanes et des contributions indirectes.
C. Combes, de l'Académie des Sciences, Inspecteur Général des Mines.
O. Léon Foucault, de l'Académie des Sciences.
O. Piérard, Inspecteur Général des Mines.
Lechatelier, Ingénieur en Chef des Mines.
Legentil.
O. Sieber.
Roy, negociant.
Bareswil, chimiste.
Chémin-Dupontès, ancien chef de bureau à la direction du commerce extérieur, *Secrétaire du Comité.*

There are also two honorary members :—

Baron C. Dupin, Sénateur, Membre de l'Académie des Sciences.
O. De la Morinière, Ancien Ingénieur en chef de la Marine.

And the committee are assisted in their deliberations by the following officers :—

Le Directeur Général des douanes et des contributions indirectes.
Le Secrétaire Général du Ministère du Commerce, &c.
Les Directeurs du Commerce intérieur et du Commerce extérieur.

Prima... Frenc... stand... custod... Direct... Gener... Archiv...

The primary French Metric standards, the platinum mètre and the kilogramme des Archives, are deposited in the Palais des Archives de l'Empire. These are used only on special and extraordinary occasions. The Department des Archives is attached to the Ministère de la Maison d'Empereur, et des Beaux Arts. The head of the Department is the Directeur Général, le Marquis Léon de Laborde, Membre de l'Institut, who is charged with the custody of the primary Metric standards.

The secondary standard weights and measures, which are the primary standards for the comparison and verification of other standards used in France and other countries who have adopted the Metric system, are deposited at the Conservatoire des Arts et Métiers in Paris, a department subordinate to the Minister of Commerce. By a decision of the minister, dated 28 April 1848, these standards, which were previously kept at the Ministère du Commerce, were transferred to the Conservatoire, together with the duties of comparing and verifying other standards.

* Annuaire Almanack, 1867, p. 33.

The chief officers of the Conservatoire entrusted with these duties are,—

Général Arthur Morin, Membre de l'Institut, &c. - - Directeur.
O. Tresca, Ingénieur - Sous-Directeur.
Herguet - - Agent Comptable.
Campion - Conservateur des Collections.

The duties of comparing, verifying, and stamping weights and measures in France are entrusted to officers called vérificateurs, of whom one is appointed for each arrondissement throughout France. They are appointed in each department by the préfet, to whom they are subordinate, and through whom they receive the directions of the Minister of Commerce. There are also three officers of verification in Algeria, with three vérificateurs en chef, six assistants, and six labourers, entailing an annual expense of 41,000 f. (1,640*l.*)

According to M. Barny (p. 288), the number of persons employed in 1863 in the service of verification in France (excluding Algiers), was as follows :—

Vérificateurs - - -	383
Assistants - - - -	72
Labourers - - - -	19
Total -	474

These were employed at the 382 offices of verification. The total charge for the remuneration of these 474 persons amounted to 789,200 f. (31,568*l.*), or, on an average 83*l.* for each office, and that of their office accommodation to 61,275 f. (2,451*l.*), or less than 7*l.* for each office.

In the published French budget of 1863, the credit for the service of the verification of weights and measures was 871,250 f. (34,850*l.*), for

1 Vérificateur en chef, at Paris, -	3,800 f.
383 Vérificateurs -	from 1,300 f. to 2,800 f.
64 Adjoints -	,, 1,000 f. to 1,200 f.

but it would appear from General Morin's letter of 17 December 1867, that this amount does not comprehend the whole charge for the vérificateurs, and that the service needs revision.

The receipt from the fees of periodical reverification was estimated at 1,474,000 f. (58,960*l.*)

It appears from the *Compte Définitif des Recettes* in 1863 (p. 375), that the amount actually received in that year as the *droits de vérification des poids et mesures* in France, exclusive of Algeria, was 1,535,622·68 f. (61,425*l.*), as compared with 1,525,529·51 f. (61,021*l.*), in 1862. This amount was received for the periodical reverification of weights and measures to which persons in business are subject, according to the tariffs annexed to the Ordonnance of 18 December 1825, and modified by the Ordonnances of 21 December 1832 and 18 May 1838. These duties became payable to the Treasury by virtue of these Ordonnances; they were previously paid to the several municipalities and were applicable to the local expenditure (p. 358). It has already been stated that the original verification of weights and measures is gratuitous, and has been so since 1838. But it is stated by M. Saigey (*Pratique des Poids et Mesures*, edit, 1856, p. 112) that the licence duty to makers of weights and measures has been proportionally increased, so that in fact the public has to contribute an equal amount of taxation in another form. The amount received for this particular licence duty is, however, not distinguished in the Compte Définitif des Recettes, but it should fairly be added to the amount above stated, in order to show the total annual receipt for verifying weights and measures in France.

Complaint of inefficient system of verification.

M. Barny, the vérificateur en chef, in his work published in 1863, calls attention (p. 264) to what he terms the vicious system of employing so large a number of officers with insufficient work for them and insufficient pay. He says that they are not employed more than 50 or 60 days in the year, and that their duties are not properly performed, and that the public service consequently suffers. M. Barny recommends that the number of officers should be proportioned to the work, and those officers should be well paid; that instead of having officers of verification in each arrondissement independent of each other, there shall be but one properly qualified vérificateur in each department or large division of the country, under whose authority and direction a sufficient number of assistants should be placed, and that all these departmental vérificateurs should again be subordinate to an Inspector General. *He adds, significantly, that such an improved system would be perfectly applicable to Great Britain.*

Proposed improved system.

M. Barny's experience has led him to propose the following scheme :—That only 90 officers of verification be established in France, one for each department, except the Département de la Seine, which should have two; that the 90 vérificateurs should be divided into four classes at different rates of salary, in proportion to the extent of their duties and their services, with sufficient assistants, similarly divided into three classes, a certain number of supernumerary assistants forming a fourth class. Promotion in the several classes to be the reward of good service and conduct.

The Inspector General to have immediately under him a certain number of inspectors, under the inspection of each of whom several departments should be placed, and who should visit the several localities once a year and report to the Inspector-General.

The expense of the new scheme is suggested as follows :—

		In French Money.		In English Money.	
		Salary, &c., per annum.	Total.	Salary, &c., per annum.	Total.
		Francs.	Francs.	£	£
	1 Inspector General - - at	20,000	20,000	800	800
1	—				
	2 Divisional Inspectors, 1st class ,,	12,000	24,000	480	960
2	Ditto 2nd ,, ,,	10,000	20,000	400	800
4	Ditto 3rd ,, ,,	8,000	32,000	320	1,280
8	—				
	10 Vérificateurs en Chef, 1st ,, ,,	6,000	60,000	240	2,400
20	Ditto 2nd ,, ,,	5,000	100,000	200	4,000
30	Ditto 3rd ,, ,,	4,000	120,000	160	4,800
33	Ditto 4th ,, ,,	3,000	99,000	120	3,960
93	—				
102	- - - Carried forward -	—	475,000	—	19,000

		In French Money.		In English Money.	
		Salary, &c., per annum.	Total.	Salary, &c., per annum.	Total.
		Francs.	Francs.	£	£
102	- - - Brought forward -	—	475,000	—	19,000
	25 Assistant Vérificateurs, 1st class, at	2,500	62,500	100	2,500
	50 Ditto 2nd „ „	2,000	100,000	80	4,000
	75 Ditto 3rd „ „	1,600	120,000	64	4,800
150	—				
	10 Supernumeraries - - „	1,000	10,000	40	400
10	—				
	25 Labourers - - - „	800	20,000	32	800
25	—				
	5 Offices (Rent of) in Paris and Algiers	1,000	5,000	40	200
	88 Ditto in Departments -	200	17,600	8	704
287		—	810,100	—	32,404

A total number of 287 persons would thus be employed at an annual expense of 810,100f. (32,404*l.*), to be set against the present number of 489 persons, at an expense of 891,475f. (39,259*l.*), showing a reduction of 202 persons employed, and of annual expense 81,375f. (3,245*l.*)

Distinct system of police inspection of weights and measures.

The system of inspection in France for the protection of the public against illegal or fraudulent practices in connexion with *dealings* in articles sold or bought by weight and measure, and for detecting and prosecuting such offenders, is distinct from that of verification, and is left to the municipal officers and officers of police. In Paris,* whilst there is a central office for the original verification of weights and measures, with a vérificateur en chef, a chef de bureau, and five assistants, and 10 bureaux d'arrondissement, for the periodical verifications, with as many vérificateurs and assistants, there appear to be nine commissaries de police employed as inspectors of weights and measures.

Latest Information on the Subject of the Metric System in France.

Latest information upon the subject of the Metric system in France.

The latest information upon the subject of Metric weights and measures in France, including the most recent table of errors tolerated, will be found in the subjoined letter from General Morin, the head of the department charged with the duties relating to them. This letter has been already referred to in relation to the information contained in it, and the accompanying papers upon the subject of the Metric system. It will be seen that although under the regulations of the Ordonnance of 1839 the local Metric standards were to be reverified every 10 years, in point of fact no such reverification has yet been effected, and that it is now being carried out by direction of the Government.

General Morin to the Warden of the Standards, dated 17 Dec. 1867.

Copy of a letter from General Morin, Directeur du Conservatoire Impériale, to the Warden of the Standards.

Conservatoire Impériale des Arts et Métiers.

Monsieur, Paris, le 17 Decembre 1867.

Il me serait bien difficile de répondre à toutes les questions que formule votre lettre du 2 de ce mois, parceque plusieurs des sujets auxquels elle se rapporte sont en ce moment même l'objet d'un travail général ; celui de la vérification des étalons métriques de tous nos bureaux de vérificateurs.

Ces bureaux sont au nombre de 371, un par arrondissement, et, depuis leur création, l'état des mesures étalons qui leur avaient été confiées n'avait pas été verifié comme le prescrit l'article de l'ordonnance du 17 avril 1839. Ce travail très-long ne sera terminé que dans quelques mois, et il sera l'objet d'un rapport spécial que je vous communiquerai, quand il sera imprimé.

Jusqu'à ce jour, le service des vérificateurs des poids et mesures a été régi par un réglement et par des arrêtés successifs réunis dans un recueil officiel dont je vous envoie un exemplaire. Il est probable qu'un nouveau réglement sera la consequence du travail dont je viens de parler.

Les étalons métriques du Conservatoire ont été l'objet d'une comparaison avec ceux des Archives en 1864. Le procès-verbal de cette comparaison faite par une commission spéciale est aujourd'hui la base de toutes les vérifications que nous faisons pour les pays étrangers auxquels on livre des étalons de nos mesures: je vous en adresse un exemplaire.

Nous avons fait adopter par le Ministère du Commerce et de l'Agriculture les tolérances que nous croyons convénable d'admettre pour les étalons des bureaux de vérification ; vous trouverez ci-jointe une copie du tableau officiel de ces tolérances, et de celles que nous proposons pour les différentes pièces des nécessaires des vérificateurs.

Celles des mesures usuelles sont fixées par le réglement que je vous ai annoncé plus haut.

Il a été fait, en 1859, une comparaison du kilogramme du Conservatoire avec celui des Archives et celui de l'Observatoire ; les resultats en sont consignés dans un rapport, qui a été imprimé en 1861 en allemand et en français par M. Brix,* Directeur du service des poids et mesures à Berlin ; ce rapport conclut à une différence en moins de $0^{\cdot}28^{\text{millig.}}$ pour le kilogramme de l'Observatoire par rapport au kilogramme des Archives. Mais, aujourd'hui toutes nos comparaisons sont basées sur le procès-verbal de 1864.

Il n'y a pas de budget spécial pour l'ensemble du service des vérificateurs : ils sont payés sur les fonds départementaux, et les redevances sont fixées dans le recueil officiel. Ce service a besoin d'être amélioré et mieux surveillé.

Aujourd'hui toutes les opérations qui se rattachent à la vérification des poids et mesures métriques sont confiées, sous ma direction, au Conservatoire des Arts et Métiers ; vos demandes ont donc été bien adressées.

Quant à M. Saigey, qui a publié quelques ouvrages élémentaires de mathématiques, il n'a aucun caractère officiel en ce qui concerne les poids et mesures, et ses livres ne doivent être considérés que comme des œuvres personnelles.

Agréez, Monsieur, l'expression de ma consideration très-distinguée.

Morin,
Directeur-Général.

H. W. Chisholm, Esq.
Warden of the Standards.

* Annuaire Almanack, 1857, pp. 794 and 1171.

* A copy of this report was received in the Standards Department from M. Brix, on 18 Feb. 1868, and has been referred to at page 25, and following pages. It was accompanied by a letter from M. Brix, and by several printed papers and documents containing much valuable information respecting the weights and measures of Prussia, and it may be desirable to lay these before the Standards Commission.

COPIE.

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Commission de vérification des Etalons de Poids et Mesures.

Tableau des tolérances à admettre dans la vérification des étalons des bureaux.

	Tolérances des Mesures de Commerce.		Instruments proposés pour la vérification.	Sensibilité effective des Instruments.		Rapports entre les Colonnes 3 et 6.	Tolérances proportionelles proposés pour les étalons.	Rapports entre les tolérances du commerce et celles des étalons.
	Absolue.	Proportionelle.		Absolue.	Proportionelle.			
Mesure de longueur.								
Mètre - -	0·20	0·0002	P. comparateur de Gambey.	0·01	0·000010	20	0·00002	10·
			Cathétomètre de Perreaux.	0·01	0·000014	14		7·
Poids.								
Kilogramme -	0·15	0·000150	Balance de Hempel -	0·002	0·000002	75	0·00002	7·5
Double kilogramme	0·25	0·000125	G. balance de Deleuil -	0·002	0·000001	125		6·2
Cinq kilogrammes -	0·50	0·000100	G. balance de Deleuil -	0·004	0·0000008	125		5·0
Dix kilogrammes -	0·80	0·000080	G. balance Américaine	0·010	0·000001	80		4·0
Vingt kilogrammes	1·50	0·000075	Balance de Kutsch -	0·200	0·000001	75		3·7
Mesures de capacité.								
Centilitre - -	0·20	0·0200	P. balance Américaine	0·002	0·00020	100	0·00002	100
Double centilitre -	0·30	0·0150	P. balance Américaine	0·002	0·00010	150		75
Demi-décilitre -	0·40	0·0080	P. balance Américaine	0·004	0·00008	100		40
Décilitre - -	0·60	0·0060	P. balance Deleuil -	0·010	0·00010	60		30
Double décilitre -	1·00	0·0050	P. balance Deleuil -	0·010	0·00005	100		25
Demi-litre - -	1·50	0·0030	P. balance Deleuil -	0·020	0·00004	75		15
Litre - -	2·00	0·0020	P. balance Deleuil -	0·020	0·00002	100		10
Double litre -	3·00	0·0015	Balance Parent -	0·100	0·00005	30		7·5
Demi-dékalitre -	10·00	0·0020	Balance Parent -	0·100	0·00002	100		10
Dékalitre - -	20·00	0·0020	Balance Parent -	0·200	0·00002	100		10
Double dékalitre -	40·00	0·0020	Balance Parent -	0·400	0·00002	100		10

Vu conformément à ma lettre de ce jour
Paris le 20 Novembre 1866.
Le Ministre de l'Agriculture, du Commerce,
et des Travaux publics.
Pour le ministre et par authorisation,
Le conseiller d'Etat, Secrétaire général
Signé DE BOUREUILLE.

Paris le 26 Octobre 1866.

Le Président de la Commission.
Signé Général MORIN.

Tableau des tolérances qui seront accordées dans la réception des Nécessaires de Vérificateur de Poids et Mesures.

1.—Balance servant à la vérification des poids de 1 à 20 kilogrammes.

Gr.
La balance fonctionnante à bras égaux, à vide, l'équilibre doit exister avec une tolérance de - - 0·01
La balance fonctionnante pour les poids de 10 kilog. l'equilibre doit exister avec une tolérance de - 0·1
Sous la charge de 1 kilog., sensibilité 0·1 gr. Différence maxima entre deux pesées successives - 0·1
Idem 20 „ idem 2·0 „ idem idem - - - 2·00

Gr.
Portant l'étalon de 10 kilog. sur le crochet, et l'étalon de 1 kilog. dans son plateau, tolérance - 1 sur le poids.
Idem 20 „ idem „ idem tolérance - 2 idem.

2.—Trébuchet servant à la vérification des poids de 50 grammes au gramme.

Gr.
A vide, sensibilité - - - - - - - - 0·001
Sous la charge de 50 grammes, sensibilité - - - - - 0·001
La somme des poids contenus dans la boite = 50 gr. à 0·01 gr.

3.—Poids à godets.

Gr.
Sur le poids de 1 kilogramme, tolérance en plus - - - - - 0·02
Idem 500 grammes, tolérance en plus ou en moins - - - 0·02
Idem 200 id. idem - - - 0·01
Idem 100 id. idem - - - 0·01
Idem 50 id. idem - - - 0·01

Mm.
4.—Mètre, tolérance en plus - - - - - - - 0·1

5.—Jauges, tolérance - - - - - - - - 0·1

Les élémens de ce tableaux, appliques à la vérification des nécessaires de vérificateurs dans le cours de l'année 1867, n'ont point encore été sanctionnés par aucun décision ministérielle.

RECAPITULATION.

Recapitulation.

By way of summary, it remains to recapitulate the principal points stated in the preceding pages.

Establishment of the Metric System in France.

1. The establishment of the Metric system in France was first publicly proposed by a Decree of the National Assembly of 8 May 1790; the law of 26 March 1791 sanctioned the mode of determining the unit and base of the new system; the law of 1 August 1793 fixed the mètre as the fundamental unit, and a decimal scale of weights and measures; and the new Metric system was definitively established by the law of 7 April 1795.

2. By the Decree of the Directory of 8 April 1799, the new Metric weights and measures were to be exclusively used in France; and the law of 9 December 1799 recited the completion of the new Metric standards, by which all the legal weights and measures of France were to be regulated.

3. The concurrent use of the old weights and measures was, to a certain extent, authorized by the Consular Decree of 3 November 1800, and by the Imperial decree of 12 February 1812.

4. This concurrent use of the old and the new systems gave rise to many irregularities and complaints, and has been stated to have virtually superseded the law which had established the Metric system, and to have practically prevented its adoption in France.

5. By the law of 4 July 1837 the Metric system was to be exclusively used in France from the 1st January 1840, and the use of all other weights and measures prohibited under penalties. The existing code of the Metric system of weights and measures in France is contained in this law, and in the laws of 7 April 1795 and 9 December 1799 incorporated with it.

6. The French Metric system includes a definite relation of the silver coinage to the Metric weights and measures, not only as regards the dimensions and weights of the coins, but also a uniform decimal scale of the multiples and parts of the units.

7. The Metric system appears now to be generally adopted in France, the exception being in the rural districts and amongst the peasantry.

Metric Standards.

8. The primary Metric standards are two only in number, the metre the unit of length and the kilogram the unit of weight, and derived from the metre; being the two platinum standards deposited at the Palais des Archives at Paris.

9. The standard metre is defined to be equal to one ten-millionth part of the quadrant of the terrestrial meridian, and, according to the computation stated in the law of 1799, is equivalent to 3 feet 11·296 lines of the ancient French measures, or 443·296 lines of the toise, the old standard of length; this was the actual length, at a temperature of 32° Fahr., of the primary platinum standard metre, the mètre des Archives, when originally constructed.

10. By the latest and most accurate measurement, the actual equivalent of this standard metre, at 32° Fahr., in terms of the Imperial standard at 62° F., is 39·3704 inches; and its legal equivalent declared in the Metric Act of 1864 is 39·3708 inches, being the same as that adopted in France, as stated in the Annuaire du Bureau des Longitudes; whilst the latest and most authoritative measurement of the ten-millionth part of the meridian quadrant passing through France is 39·3762 inches.

11. Neither the material, mode of construction, and state of preservation of the standard mètre des Archives appears to be satisfactory for so important a primary standard.

12. The standard kilogram is defined to be the weight of a cubic decimetre of distilled water at its maximum density, and it was taken as the result of experiments made for the purpose, that this weight was equal to 2 livres 5 gros and 35 grains, or 18,827·15 grains of the old standard of weight, the poids de marc; this was determined to be the actual weight, in a vacuum, of the primary platinum standard kilogram, the kilogramme des Archives, when originally constructed.

13. By the most accurate comparison, made by Professor Miller in 1844, the actual equivalent of the standard kilogram in terms of the Imperial standard is 2·20462525 lbs., or 15,432·34874 grains; being the same as the legal equivalent declared in the Metric Act of 1864, viz., 2 lbs. 3 oz. 4·383 dr., or 15,432·3487 grains, and now adopted in France, as stated in the Annuaire du Bureau des Longitudes.

14. It is stated that the impurity of the platinum of which the kilogramme des Archives is composed, renders it an unsatisfactory standard for the primary Metric standard of weight.

15. There appears to be a still greater discrepancy between the defined weight of the kilogram and the actual weight of the primary standard, the kilogramme des Archives, than exists with respect to the metre.

16. In point of fact, the primary standard units of length and weight of the French Metric system are not scientific standards, defined from the actual length of the meridian quadrant, but are those material platinum standards deposited with the Imperial Archives at Paris.

17. For all practical purposes, the official copies of the standard metre and kilogram, deposited at the Observatoire, and more particularly those at the Conservatoire des Arts et Métiers, represent accurately the two primary standards, the actual amount of difference from the standard of each of these official copies having been determined from time to time, and the latest comparisons having been made in 1864, by a commission appointed by the French Government for that purpose.

18. There is now in the Standard Department at Westminster a newly constructed subdivided standard yard, laid down upon a bar of Baily's metal, upon which a subdivided mètre has been also laid down, the length of the mètre being derived from the platinum line standard mètre of the Royal Society, verified by M. Arago with the French standard. This new standard mètre has not yet been verified.

There are also two standard kilograms accurately verified by Professor Miller; one of platinum, and compared with the French standard in 1844; the other of gun metal gilt, and compared with the platinum kilogram; the exact differences in each case being ascertained.

19. There is no other official standard of weight and measure in France than the metre and kilogram, and no standard litre or unit of capacity.

20. The local standards provided for the several bureaux de vérification are constructed from and verified by the copies of the two Metric standards, the metre and the kilogram.

21. Although it is provided by the French law of 1837 that the local standards shall be reverified every ten years, no such verification has yet been made, but steps are now being taken for that purpose.

22. There appears to be no sufficient provision for the local verification of French Metric weights and measures demanding great accuracy.

Regulation of French Metric Weights and Measures.

23. All the ancient local rights of regulating weights and measures in France were abolished in 1790, at an early period of the revolution.

24. Since this period the duties of verifying and stamping all commercial weights and measures have been entrusted to Government officers, called vérificateurs, appointed for each locality, and provided by the Government with the requisite standards and apparatus; whilst the duties of inspecting commercial weights and measures, for the purpose of ensuring their legality, and guarding against fraud and negligence, not only as regards the weights and measures,

but also all dealings with them, have been left to the officers of municipal police.

25. All the general regulations for constructing and verifying French Metric weights and measures, including the service of verification, are under the law of 4 July 1837 to be made by Royal or Imperial Ordonnances.

26. The general regulations for the service of verification are contained in the Royal Ordonnance of 17 April 1839; and those for the construction of Metric weights and measures in the Royal Ordonnance of 16 June 1839. Some modifications have been made by subsequent Ordonnances.

27. The duties of carrying out these Ordonnances, and of furnishing detailed instructions to the several officers, are entrusted to the Minister of Agriculture, Commerce, &c., who is assisted by a permanent consulting committee of official and scientific persons attached to his department.

28. The general instructions for the service of verifications are dated 30 August 1839, and those for the construction and mode of verification of Metric weights and measures on 15 September 1839. Supplementary ministerial instructions have since been issued and circulated from time to time for special purposes.

29. The ministerial instructions are issued to the préfets of each department, and by them communicated to the officers of verification appointed for each arrondissement, and who are subordinate to the préfets.

Service of Verification.

30. The chief department of weights and measures in France is the Conservatoire des Arts et Métiers, a department subordinate to the Minister of Commerce, &c., the chief officer being the directeur, General Morin, who has the custody of the official standards for regulating all commercial weights and measures, and is charged with the duties of comparing and verifying copies of these standards.

31. The local verification of commercial weights and measures is carried out by the vérificateurs, one being appointed for each of the 371 communal arrondissements, and assisted by subordinate officers.

32. The vérificateurs were originally appointed in 1837 by the Minister of Commerce on the recommendation of the préfets. Since 1852 the appointments of the vérificateurs in the several arrondissements have been left to the préfet of each department, to whom they are subordinate.

33. There are strict regulations for the appointment of vérificateurs, there being a limit as to age, a competitive examination on specified subjects, and a prohibition against any vérificateur holding any other public employment, or exercising any trade subject to verification.

34. The standards and apparatus, including the stamps, registers of verification, and furniture of the offices, are supplied by the Government to the vérificateurs; their salaries and rent of offices also being paid by the State.

35. The total charge for the service of verification in 1863 payable by the State amounted to 34,850*l.*; but it would appear that a further charge for travelling and other expenses was payable from the departmental funds.

36. There are two distinct kinds of verification: the original verification of all weights and measures when first constructed, and before being issued for use; and the periodical reverification of all weights and measures used by traders or for commercial purposes.

37. There is no charge for the original verification, a licence duty upon all makers of weights and measures being substituted. The annual amount of this licence duty does not appear to be distinguished in the published accounts of the receipt of French revenue.

38. Certain fees are payable upon the periodical reverification, which generally takes place annually, either on the premises or at the official bureau. The amount received in 1863 for these fees of verification was 61,425*l.*

Construction and Verification of French Metric Weights and Measures.

39. The denominations, form, and material of all Metric weights and measures are determined by Government regulations.

40. A complete set of local standards of Metric weights and measures furnished to each bureau de vérification is as follows :—

5 measures of length, including—
- a graduated brass mètre,
- a wooden mètre,
- a double décimètre,
- a dékamètre, chain for measuring land,
- a chain mètre for measuring firewood.

5—Total measures of length.

- 11 brass measures for liquids, from the double décalitre to the centilitre.
- 11 wooden measures for dry goods, from the hectolitre to the demi-decilitre.
- 2 ditto for coal, the hectolitre and demi-hectolitre.
- 8 pewter measures for liquids, from the double litre to the centilitre.
- 8 ditto with handles, ditto.
- 7 ditto with handles and covers, from ditto to the double centilitre.
- 8 tin-plate ditto, for milk and military rations, from ditto to the centilitre.
- 8 ditto for lamp oil, marked B.
- 8 ditto for table oil, marked M.

71—Total measures of capacity.

- 23 brass weights with knobs, from 20 kilograms to the milligram.
- 12 ditto nest weights, from 500 grams to 1 gram.
- 10 cast-iron weights, from 50 kilograms to 50 grams.

45—Total weights.

121—Total weights and measures.

41. The apparatus includes three balances and a hydrostatic balance, a stamping press, and the following 22 stamps, viz. :—

- 11 stamps with a crown for the original verification of the several descriptions of weights, measures, &c.
- 11 sets of stamps with a variable letter for the periodical verification.

42. A smaller collection of standards and apparatus fitted in a case, and portable, is also provided.

43. All wooden measures for dry goods must be constructed of specified woods and dimensions, and according to prescribed patterns.

44. All pewter measures for liquids must be constructed of standard metal, and of specified dimensions and weight.

45. All tin-plate measures for milk and oil must be constructed of tin plate of a specified strength, and must be of specified dimensions.

46. All weights must be constructed of brass or iron, and of specified dimensions, and according to prescribed patterns.

47. Every weight and measure must have legibly marked upon it the name or mark of the maker and its legal denomination.

48. Every balance and steelyard and other weighing machine must have legibly marked upon it the name of the maker and the weight which it is constructed to carry.

49. All balances, steelyards, and other weighing machines used for commercial purposes must be duly verified and stamped, both originally and periodically.

50. All weights used for weighing machines must be Metric weights of the legal denominations, and must be duly verified and stamped, both originally and periodically.

51. A specified amount of error is allowed in the verification of all weights, measures, and balances.

52. The préfet of each department regulates the traders and others whose weights, &c. are subject to periodical reverification, as well as the minimum assortment of weights, &c. for each description of traders, &c., and the time when such verification shall take place.

53. The periodical verification is to be completed every year by the 1st August, when a schedule of the fees payable by the several parties is prepared by the vérificateurs, and transmitted to the proper officers of the direct taxes for collection in the usual course.

Inspection of French Metric Weights and Measures, and of Dealings with them.

54. The inspection not only of weights and measures used for trade purposes, but of all articles bought and sold by weight or measure, and of all dealings in them, is entrusted exclusively to officers of the municipal police.

55. To aid this inspection, the law of 1 August 1793, which is still in force, imposes upon the several municipal authorities of every commune the obligation of providing copies of the principal standards of Metric weights and measures, to be kept at the chief town of each district.

56. All vessels for holding liquids, not purporting to be measures of capacity or of weight, are exempt from the operation of the weights and measures laws.

57. The functions of the police, in connexion with weights and measures, extend to all infractions of the laws relating to weights and measures, or to articles bought and sold by weight or measure, and to all dealings with them, viz., the use of all fraudulent or defective or illegal weights and measures; using any weight or measure hurtful to the public health; any fraud or adulteration in the quantity or quality of the article sold; reciting any illegal weight or measure in any published placard, or document, or announcement.

58. Whilst this inspection of weights and measures, properly so called, is left to the police, the vérificateurs also are to lay informations against any infractions of the laws which may come under their notice, in their duties of verification; and to seize all illegal or defective weights, measures, or instruments for weighing or measuring.

Penalties for Offences connected with Metric Weights and Measures in France.

59. The penalties for offences connected with weights and measures are to be found in the Penal Code of France.

60. The mode of proceeding is laid down in the Law of Criminal Procedure.

61. The lightest offences are infractions of the weights and measures laws or regulations, punishable with a fine of from 1 to 50 fr.; and in case of a second offence, with imprisonment for not more than three days.

62. Traders using unauthorized or defective weights or measures are liable to a fine of from 12 to 15 fr., and imprisonment not exceeding five days, with confiscation of the weights and measures; on a second conviction, always to be imprisoned for five days.

63. Traders having in their possession without lawful excuse fraudulent weights or measures, or instruments for weighing or measuring, or any adulterated article of food or medicine, are liable to a fine from 16 to 25 fr., and imprisonment from six to ten days.

64. Traders using false weights and measures, with intent to defraud, or in any way defrauding or attempting to defraud a purchaser with respect to the article sold, or to be sold, are liable to imprisonment for not less than three months or more than a year, and to a fine not exceeding one-fourth of the amount defrauded and damages, but not less than 50 fr. The false weights and measures, and the fraudulent articles, or their value, to be confiscated; and the sentence may be publicly posted up.

65. If in the last case the articles are adulterated, the fine may be increased to 500 fr. and the imprisonment to two years.

66. Persons improperly in possession of and using a Government stamp are liable to a fine not less than a 100 fr. or more than 3,000 fr., and to imprisonment for not less than six months or more than three years. They may also be placed under the surveillance of the police for an additional similar period, and forfeit certain civil rights for not less than five or more than 10 years.

67. Persons counterfeiting or knowingly using or attempting to counterfeit or use any Government stamp, are liable to imprisonment for not less than two or more than five years, and may be placed under the surveillance of the police, and lose certain civil rights for a similar period.

68. Persons committing second offences are subject to cumulative or increased penalties.

69. In cases where the jury may find extenuating circumstances, the minimum or a less penalty to be inflicted.

Conclusion.

Conclusion

In this paper the subject of the Metric system of weights and measures, as established in France, has alone been referred to. The subject of the French Metric system, as a proposed international system of weights and measures, and more particularly as involving the question of its introduction and establishment in this country, remains to be considered. This will form the subject of a subsequent paper.

H. W. Chisholm,
Warden.

Standards Department, April 3, 1868.

APPENDIX III.

On the Question of the Introduction of the Metric System into the United Kingdom, as a National or International System of Weights and Measures; with references to its Introduction into other Countries.

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On the Question of the Introduction of the Metric System into the United Kingdom, as a National or International System of Weights and Measures; with references to its Introduction into other Countries.

Introduction.

The question of the introduction of the Metric system into this country has already been referred to in Sec. 17 of the First Report of the Standards Commission as one of great importance, to which the early and careful attention of the Commission will be given. For some time past every effort has been made to collect the fullest information upon the subject, and the time has now arrived when this information may be laid before the Commission for their consideration, and when it has become imperative that their opinion upon the question should be given at the earliest possible moment.

Pressing importance of the question.

Before entering upon the more important subject of the introduction of the Metric system into this country, it may be proper to state the circumstances that render it necessary that the immediate attention of the Commission should be given to this question.

These circumstances have reference to the proposed introduction of the Metric system into India. The Board of Trade has received a communication from the India Department, transmitting printed copies of the several proceedings in India for the proposed revision of the weights and measures, by which it appears that the Government of India propose to introduce the French Metric system of weights into India, and the Secretary of State for India requests to be favoured with the opinion of the Board of Trade as to the proposed reform, *and whether any measure is under consideration for a change in the weights of this country.* The Board of Trade has referred these papers to me, as Warden of the Standards, for an expression of my views, and it is obvious that the question, as regards India, turns upon the course which may be adopted with respect to the introduction of the Metric system into the United Kingdom. But it is also obvious that the proposed introduction of the Metric system into India is a material point in the information required by the Commission to assist their judgment upon the general question as regards the United Kingdom; although the special question of Indian weights and measures has not been itself referred to the Commission, nor is their opinion upon it either asked for or required. It follows that the duty required of me by the Board of Trade cannot be properly discharged without the action of the Commission, and until they shall have pronounced their opinion upon this last important question.

Proposed mode of its treatment. See App. II.

Full information has already been laid before the Commission respecting the Metric system as it is now in force in France. In the treatment of the subject of this paper, I propose to consider it under the following heads.

1. The proposed introduction of the Metric system into India.
2. Its actual introduction into other countries, more especially the territory of the North German Confederation, and the United States of America.
3. The general question of its introduction into the United Kingdom, either as an international or national system of weights and measures.
4. Suggestions as to the most expedient and practical mode of dealing with the general question.

I. Proposed Introduction of the Metric System into India.

Reform of Indian weights and measures.

The papers relating to the proposed revision of Indian weights and measures, which have been transmitted from the India Department, are at considerable length, and it may be expedient to give the following summary of them, in which it is hoped that all the details requisite for the information of the Commission may be found.

Indian Weights and Measures.

Minute of Indian Governme 25th June 1867.

The Supplement to the Fort St. George Gazette, of 19th July 1867, contains a minute of the proceedings of the Indian Government on the reform of the system of weights and measures in India, dated Simla, 25th June 1867.

Appointment of Central Committe at Calcutt

The result of the proceedings was the appointment of a Central Committee at Calcutta, consisting of,—

- Colonel Strachey, R.E., President.
- The Master of Calcutta Mint.
- Comptroller General of Accounts, Mr. E. F. Harrison.
- Two members to be nominated by the Chamber of Commerce, Calcutta.
- Member of Bengal Civil Service, Mr. R. B. Chapman.
- Member of Bombay Civil Service, Hon. J. S. Stewart.
- Member of Madras Civil Service to be nominated by the Madras Government.
- Three native members to be appointed by the Bengal Government.
- And any other natives of Bombay and Madras, at Calcutta, to be nominated by their respective Governments.

They were instructed to revise the system of weights and measures in British India; to construct such a system as would give general satisfaction, being "guided in their selection of any system rather "by considerations of its practical convenience for "adoption in India generally, and its capability of "being placed in easy relation with that now existing "in England;" and "to submit a Bill for giving "general effect to their recommendation which the "Legislature may be able to adopt without objec- "tion."

Previous proceedin of the Indian Govern- ment, fro 1837.

The question of revising the Indian metrical system had previously engaged the attention of the Government of India at various periods since the year 1837, but the information available had always been insufficient for a decision as to the scale which it was most expedient to adopt.

Local Co mittees a pointed i 1864.

On 13th May 1863, the Government of Madras suggested the importance of steps being at once taken to reform the various systems of weights and measures in use throughout India, and that a committee should be appointed for that purpose. On 20th June 1864, a resolution was passed by the Government of India, which was subsequently approved by the Secretary of State for India, that, as a preliminary measure, local committees should be appointed in each Presidency to deliberate and report upon the whole matter.

Their reports.

The several reports made by the committees appointed in pursuance of the resolution, together with other papers on the same subject, were laid before Parliament in 1867. These reports and papers were submitted to the Central Committee at Calcutta for their consideration.

Commons Paper 16, 1867.

Mr. Bayle scheme fo reforming Indian weights a measures based on Imperial units.

Mr. W. H. Bayley, of the Madras Civil Service had, in 1857, proposed a uniform system of weights and measures for India based upon the Imperial system, that is to say, the Bengal seer fixed at two lbs. avoirdupois as the unit of weight; the Imperial quart as the unit of capacity; and the yard and acre, as the units of linear and superficial measure.

Mr. Bayley advocated decimal multiples and binary subdivisions of the units of weight and capacity, and decimal divisions of measures of length, including the mile.

His proposal was taken into consideration by the Local Committees. At Madras and Bombay, in the North-West Provinces, and the Punjaub, the Committee were in favour of Mr. Bayley's scheme, with more or less modifications. In British Burmah, any alteration of existing weights was deprecated, but the introduction of the English bushel was advocated. The Bengal Committee opposed Mr. Bayley's scheme. They thought the days of the Imperial system of weights and measures numbered, and that when all

the rest of the world had adopted or was about to adopt the French Metric system, it would be a retrograde step to adopt the English weights and measures. They therefore proposed the gradual but finally complete adoption of the French Metric system, and their recommendation received the support of the Bengal Government.

On 1st October 1867, Colonel Strachey, the President of the Central Committee, with the view of bringing forward an expression of public opinion, published a memorandum, in which he supported the proposal of the Bengal Committee.

He was of opinion that the assimilation of the English weights to those of France was a mere question of time, and that the existing English system could not last. He therefore advocated the adoption of the French kilogram as the basis of the new system of weights in India.

Colonel Strachey had more hesitation as to measures of length, and would defer any change. But he objected distinctly to the general introduction of the English foot as a standard, as he believed it would eventually have to be given up. If any new uniform unit were to be introduced, he thought the metre the best standard to adopt.

For measures of capacity he considered the proper course would be to adopt the litre as the unit for dry measure. For liquids, the necessity for any measures hardly arose, as regards the mass of the people in India.

A draft of a bill to regulate the weights and measures of India was appended to Colonel Strachey's memorandum; he proposed the bill to take effect from 1st January 1871. It provided for the legal establishment of all the French metric weights and measures; the construction and deposit of official and local standards; the appointment of officers and local inspectors, together with the requisite provisions for the discharge for their duties, and for the regulation of commercial weights and measures.

After the publication of this memorandum, finding that it did not meet with the assent of a majority of his colleagues, Colonel Strachey retired from the Committee almost at the beginning of its labours. He was succeeded by Mr. Schalck, who left India shortly afterwards on account of ill-health and gave place to Mr. Minchin, as President.

The Report of the Committee, dated Calcutta, 25th March, 1868, is at considerable length. After reciting the respective proposals of Mr. Bayley and Colonel Strachey, they thought the point for them to decide was whether the new standards should be based on the English or French units.

They reviewed the evidence as to the probable adoption of the Metric system in England, including the proceedings of the Decimal Coinage Committee in 1853, and of Mr. Ewart's Committee on weights and measures, in 1862, and contrasted the recommendations of the latter with the infinitesimal results of the Permissive Metric Act of 1864. They came to the conclusion that no single step has been taken by the Government authorities to encourage the introduction of the Metric system in England, and that the public at large refuse to take any interest in the matter. The Committee drew special attention to what they deemed the unanswerable statements addressed to them by Sir John Herschel and Mr. W. Bayley (whose letters are appended to the Report,) that "nothing, we may rest assured, will ever induce "British shopkeepers, farmers, and their customers "to buy and sell by the metre, kilogram, and the "litre; or British proprietors to alter their title "deeds and measure their land by the hectare;" and they stated their opinion that the British public will never submit to the inconvenience that would be entailed by such a change for the benefit of the comparatively few persons who are engaged in engineering work, statistical and scientific calculations, and foreign commerce. The Committee add that even the advocates of the Metric system generally acknowledge that it can never be adopted in English internal trade, except by a compulsory law, and they cannot imagine that such a law can ever be passed by an English House of Commons. On full consideration of the question, they state their opinion that the abandonment by England of her own system of weights and measures in favour of the Metric is a most remote, if it can be allowed to be at all a possible, contingency.

Recommend new system, based on Imperial units, with decimal multiples and binary divisions.

Admitting the inherent excellencies of the Metric system and the advantages of its universal adoption, they had to consider the more immediate correspondence of India with England, her trade with England and countries having English weights being ten times as great as her trade with countries using Metric weights; considering also that English weights and measures were already to some extent introduced in India, they thought it clear that the Indian system of weights and measures should be assimilated with the English.

s. 77.

On these grounds the Committee adopted Mr. Bayley's scheme almost in its entirety, and recommended the introduction of the following standards:—

For length.—The yard, cubit, foot, and inch.

For area.—The acre; but only in Government transactions.

For weight.—The seer of 2 lbs., with binary divisions down to the 256th part, and decimal multiples.

The maund	-	50 seers.
The double maund, or sotee	-	100 „
The ton	-	1,000 „

Decimal subdivision was also permitted.

The tola of 180 grains was abandoned, and the new tola, equivalent to $\frac{1}{2}$ oz., proposed for the Post Office.

The existing connexion between the weights and coinage was given up.

For capacity.—The quart, containing, when struck, 1 seer weight of grain or rice, with binary divisions down to sixteenths, and decimal multiples.

They recommended that the Indian names of the weights and measures, nearest corresponding with the proposed new weights and measures, should as far as possible be retained.

In other details, including the mode of introduction of the new system, and the practical measures for carrying it out, they availed themseives of Colonel Strachey's suggestions, with some modifications.

The Committee appended to their Report the draft of a bill to carry out their recommendations.

The Report is signed by Mr. Minchin, the President, and eight other members of the Committee, three of them being natives. Two of these members added a note recommending the alteration of the present English cwt. and ton to 100 and 2,000 lbs., as without this change the new system of weights and measures for India would be of no use to her in her commercial relations with England. Two other members, Mr. Hyde and Mr. Harrison, dissented from the views adopted in the Report, and did not sign it.

Summar evidence appended to the Report.

The evidence of 17 witnesses is appended,—

Dr. Shekleton, the acting Master of the Mint at Calcutta, did not think a connexion between the currency of India and its weights necessary, though desirable.

Three members of the Bengal local Committee were examined who had signed the Report recommending the Metric system. Of these, two were English, Mr. Blandford, Professor of Physical Science at the Presidency College, and Colonel H. Gastrell. They appear to have had no personal knowledge or experience of the Metric system, and to have based their opinion on the statements published by its advocates. The third, a native Zemindar in Bengal, stated that he had since changed his opinion, and would now

prefer the Imperial Indian system. He thought the attempt to enforce the Metric system within a reasonable period would create such a revolution that it neither could nor should be compulsorily introduced.

Three merchants at Calcutta were examined. Two of them, one a German, the other an American merchant, agreed as to the confusion and inconvenience of the existing system; that the adoption of the Metric system would facilitate trade, but not unless it was also adopted in England; and that the Metric system would not be so readily adopted by the natives as the Imperial, with which they were better acquainted. The third, a French merchant, approved of any decimal system, and thought the French system the best, but that the decimalized 2-lbs. seer would be more easy to introduce.

Two railway officials gave evidence,—Mr. Power, chief engineer, and Mr. Stephenson, East Indian railway agent. For local measures, British Indian Maund weights were used, and British measures of length. Each preferred the Metric system, but agreed that there would be no appreciable difference in the difficulty of introducing either the Metric or Imperial system.

Six other native witnesses were examined. Only one of these, the Philological Secretary to the Asiatic Society, advocated the Metric system, though he admitted that English weights and measures were now extensively used in India. A similar admission was made by the other witnesses, three of whom approved of Mr. Bayley's scheme, and one preferred the existing system if made uniform.

The Collector of Customs at Calcutta gave evidence that the customs duties were imposed by English weights and measures; he advocated Mr. Bayley's scheme, and thought it would be better received by the mercantile community than the Metric system.

and of other papers also appended.

Other printed papers are appended to the Report:—

A.—A letter from Colonel De Lisle, Consulting Engineer for Railways. He is of opinion that the new system should be based on English, not on Metric units; that it is important that any change, if made, should be made once for all. He is entirely in favour of a decimal scale, but that the subdivision should also be binary; for instance, that if a yard be divided decimally on one edge, it shall be divided binarily on the other. He is opposed to the adoption of the French Metric system, and thinks it has no special superiority over any other decimal arrangement of weights and measures, and that the convenience of its having been adopted by continental nations is not so great as at first sight may be supposed. He advocates also the decimalization of the English weights.

A second letter from Colonel De Lisle, contains more detailed suggestions for the decimalization of the proposed new Indian weights and measures based on English units, and of the coinage.

B.—A letter from Sir J. Herschel, which has been already referred to. He also calls attention to the striking fact of the all but mathematical precision of the numerical relations between the British imperial units and the dimensions of the earth with respect to its axis of rotation, as shown in his pamphlet, "The Yard, Pendulum, and Metre," and that they are much closer than the actual relation of the Metric units to the French meridian quadrant.

C.—A letter from Mr. Bayley, answering objections raised against his scheme. He states his grounds for believing that the Metric system will not be legally enforced in England, in this generation at least. But Mr. Bayley admits, "*if there were any probability of the French Metric system being introduced into England, I would advocate its immediate introduction into India.*"

D.—Points for consideration as revised by the Committee.

E.—A letter from Mr. C. Gover, author of "An Uniform Metrology for India," addressed to Colonel Strachey, and advocating his proposal.

F.—A paper from Mr. Reinhold, also advocating Colonel Strachey's scheme. This letter treats the question as affecting the trade and commerce with other countries. It is forwarded by the Chamber of Commerce at Calcutta, with the concurrence of the President and Vice-President.

G.—Note on decimalizing the Indian coinage, by Dr. Shekleton, acting master of the Mint.

H.—A second letter from Sir J. Herschel, showing that raising the standard temperature of the imperial weights to 68·5° F. would bring the weight of the imperial ounce into *absolute* coincidence with $\frac{\text{geometrical cubic foot}}{1{,}000}$, weighed *in vacuo*, and that a similar change of standard temperature in the Imperial yard would make it coincide still more closely with the geometrical yard.

I.—From C. Rangacharloo, Assistant Commissioner, Paper Currency, Calicut, advocating the *tola* altered to a convenient part of the pound avoirdupois, as the only general standard unit for all India, with the existing scale adapted to this unit, thus rendering English and Indian weights easily convertible.

K.—A second letter from Mr. C. Gover, further objecting to Mr. Bayley's scheme, and urging the advantage of that of that of Colonel Strachey's, arguing that Metric weights and measures correspond much more nearly with those of the existing Indian system than Imperial weights and measures.

L.—Note by W. J. Herschel, magistrate at Midnapore, with a table of proposed Indian weights and measures, corresponding to his father Sir John Herschel's new scientific units based on the polar axis of the earth, instead of the French meridian quadrant; adopting also the 2 lb. seer.

M.—A paper by E. Harrison, comparing the statute acre and Bengal beegha of 1,600 square yards, and stating the greater convenience of the latter in India.

N.—A letter from D. W. Campbell, locomotive superintendent of East India Railway, concurring in Colonel Strachey's proposals.

O.—A letter from Colonel Orr, Secretary to Government Public Works Department, Fort St. George, enclosing several letters from railway engineers and agents, urging the unsuitableness of existing Indian weights, and the adoption of the English avoirdupois scale, and stating that the Governor in Council fully concurs in their views.

P.—From Mr. Macandrew, officiating Secretary to Chief Commissioner, Oudh, to Colonel Strachey, stating that the Chief Commissioner entirely agrees in his views as to Metric weights, but is not prepared to adopt the metre, as English measures of length are now extensively used. He would defer all action in respect of measures of length and of capacity until some future time. He concurs in the recommendation that the English acre should everywhere be adopted as the standard of land measure.

Q.—Extract of letter from J. Westland, deputy collector of Nuddea. Objects to Colonel Strachey's decimal scale as unsuited to the quarternal scale of numeration used by the native Indians.

Colonel Strachey's Memorandum of 1st October 1867, is also appended. This has been already referred to.

Including a dissent from Colonel Strachey and 1860 other members of Committee.

Next follows a dissent from the Report of the Committee, by Colonel Strachey, concurred in by Mr. Harrison and Lieutenant-Colonel Hyde, members of the Committee. Dated Calcutta, 25th March 1868.

He denies that in India, as a whole, there is any appreciable knowledge of English weights and measures.

s. 4.

He ridicules the *non possumus* argument as to the adoption of the Metric system in England as "the obstinate adherence of ignorant men to their old prejudices;"

s. 21.

And urges that this argument would apply with equal force against the adoption of any new system in India.

s. 24.

He argues at some length that the Indian weights and measures can in no way be assimilated to those of England, as recommended by the Committee.

s. 25, &c.

He next asserts the sufficiency of a decimal scale of subdivision, and that it is just as convenient for all the purposes of ordinary life as any binary scale.

And in reference to Sir J. Herschel's letter, he can see no particular importance in the numerical relations that happen to exist between the English units and the length of the polar axis, though they may on the surface appear curious. For the same reason, he attached no special intrinsic value to similar relations in the Metric units.

A rejoinder to Colonel Strachey's dissent is added from Mr. Minchin, the President of the Committee, defending their Report.

A communication from the Lieutenant-Governor of the Punjaub follows. Colonel Strachey's proposals were submitted by him to a Committee appointed for the purpose. They advocated the adoption of the metre, but objected to the metric weights, preferring those of the Imperial Indian system. The Lieutenant-Governor himself concurs in Colonel Strachey's proposal, and adds a memorandum from Mr. Munro, C.E., urging the advantage of adopting the Metric system entirely.

After some further communications from different localities there is a minute at some length from the Hon. J. Strachey, dated Simla, 4th August 1868, to which the entire concurrence of the Hon. H. S. Maine is added. He comments on the preceding papers and the difficulty of assimilating the Indian weights to the English, if the seer of 2 lbs is adopted. He thinks that in the interest of the people of India a seer of $2\frac{1}{4}$ lbs. would be the best unit to adopt, which would also be nearly identical with the kilogram of 2·205 lbs. But he would prefer the Metric system, and quotes with approbation the view taken by Sir Stafford Northcote in his Despatch of the 15th February 1868, that it would be better to take the new Indian unit from the Metric system, and then make the Indian weights correspond with those adopted by almost all civilized countries except our own. He would, however, take no measures to enforce its use except in public Departments.

A minute from the Commander-in-Chief, Sir W. R. Mansfield, dated 5th September 1868, brings the whole matter to a decision. He considers that the question of altering the measures of length, area, and solidity, have not the same importance as attaches to measurement by weight, the English measures being now commonly used by the natives in India. He is informed that measures of capacity are comparatively little used in India. He arrives at the conclusion that, at all events for the present, attention should be confined to weights.

He thinks that on the whole the balance of argument is in favour of introducing the Metric system with regard to weights, and that it should be finally enforced for general use without delay.

He adds,—

"The Committee's recommendation seems to me to "be out of the question, because, while it dislocates "India, it requires England to dislocate herself for "the assumed convenience of India, without reference "to a general principle which would place the former, "viz., England, *en rapport* with the most advanced "Continental nations."

And concludes,—

"It may be that hereafter it will be expedient to "introduce the Metric system with the 'measures' "as well as the 'weights' into India. But, even if "this be so, I am persuaded we shall advance more "quickly if we confine ourselves in the first instance "to what is actually required by the circumstances of "the country, and then attempt to do but one thing "at a time in a course of reforms which peculiarly "interfere with old customs and habits of thought, "resting on many centuries of practice."

The following minute of the Governor-General is added, dated Simla, 16 October 1868 :—

"I concur very generally in Sir W. Mansfield's "views. Bring up in Council.

"JOHN LAWRENCE."

Two minutes from members of the Council are also included in these printed papers from India. Minutes of Hon. G. N. Taylor and Sir R. Temple.

In a minute dated 16 September 1868, the Hon. G. N. Taylor attaches more weight to the practical administrative experience and intimate knowledge of the natives, possessed by the members of the Committee who signed the report than the scientific theory and logical arguments urged by the dissentient members. He thinks that Mr. Bayley's scheme has greater merit than any other, and that until the Metric system is adopted in England, of which he is extremely sceptical, any move in the direction of the Metric system would be premature and even mischievous. He earnestly trusts that if any such recommendation is made to the Secretary of State, it will be confined to weights only. He would make no change in measures of length, &c., the English measures being in almost universal use and well understood by the people in those parts of India with which he is personally and officially acquainted.

The Hon. Sir R. Temple's minute is dated 6 October 1868. Looking to the convenience of the people of India, he would recommend the Metric system of weights for India, whether adopted in England or not, a comprehensive change in respect of weights being absolutely needed. He is inclined to think that the same principle should be followed in respect to measures of solidity and capacity. He doubts the necessity of any change as regards measures of length and area, and would leave them for the present as they are.

The whole matter is summed up in a despatch to the Secretary for India, from the Governor-General in Council, dated 6th November 1868. The following are the important paragraphs of the despatch which bear upon the subject :— Despatch o Gov.-Gen. in Council, 6 Nov. 1868.

"4. The perusal of the voluminous papers which are now before us has satisfied us that an immediate reform of Indian weights and measures is urgently required. On this point there is no difference of opinion among all the authorities that have been consulted.

"5. The existing diversity of weights and measures in this country is a most serious evil, and reform is needed, as observed by our honourable colleague his Excellency the Commander-in-Chief, not only to facilitate and simplify commercial operations, but also as an essential preliminary towards the suppression of the fraudulent practices which are now so common among retail dealers.

"6. On the question how the needful reform might best be carried out, opinion has differed. On this subject we would first observe that to deal with the weights of the country is of far greater practical importance than to deal with the measures of length, area, or capacity. We consider it advisable that reform should proceed gradually and that our earliest efforts should be devoted to the correction of the evil of the greatest practical importance. We, therefore, think that it will be best to limit our present action to the reform of the system of *weights*, leaving the question of *measures*, which does not press for such early decision, for future consideration.

"7. This point being settled, it remains to decide on the precise new system of weights to be established.

"8. We have carefully considered the arguments advanced by the Committee, and by the other authorities who take the same view in favour of the adoption of the English pound as the new Indian unit, and also the arguments adduced by other authorities in favour of the introduction into India of the Metric system. In deciding between these proposals it appears to us essential that our conclusion should be based exclusively on a consideration of the convenience of the people of India, and that we are bound to select a system which shall be in all respects thoroughly and permanently convenient to them.

"9. As regards the Committee's proposal, we entirely concur with our honourable colleague, Mr. Strachey, in the remarks recorded in paragraphs 8 to

14 of his minute. For the reasons there assigned, we are of opinion that the adoption of the English system of weights is not advisable. Neither the English pound, nor any multiple of it, can be a convenient unit of weight for India. It has been almost universally admitted that the new unit should approximate to the existing Indian seer, the average weight of which is about 2¼lbs. To reduce the seer to 2lbs. would be extremely unpopular and objectionable.

"10. On the other hand the kilogram of the Metric system, which weighs 2·205 lbs. at once provides a seer, which would certainly be as acceptable to the people as any that could be chosen. Further we consider that on account of its simplicity and its symmetrical form, the Metric system of weight, in its integrity, will be more convenient for India than any other. While it will be perfectly suitable for the internal wants of India, it will be in harmony with the system which has been already adopted in the greater part of the civilized world, and which may be ultimately adopted by England herself. In any case, it will be more convenient for commercial transactions between England and India, than any other system not really commensurable with that of England.

"11. We therefore consider that the new unit of weight should be a seer equal to the kilogram, or 2·205 lbs. avoirdupois, and that a system of decimal multiples and subdivisions of the unit of weight should be accepted as a fundamental part of the new scale to be recognized by law. We are, however, of opinion for the reasons stated by Mr. Strachey in his minute, that other multiples and subdivisions should not be prohibited wherever their continued use appears to be demanded on considerations of present convenience and expediency, and that while it is desirable that the new system of weights should be brought into general use as speedily as possible, it should not be forced on any class of the community until such class is to some extent prepared for it. The best preparation for the general adoption of the new weights will undoubtedly be their introduction and authoritative use in the public departments of the Government, which are so widely scattered over the whole of the country. We therefore propose that the new unit of weight, with a system of decimal multiples and subdivisions, should be authoritatively adopted by all departments of the Government, by all municipal bodies, and on the railways, as soon as practical convenience will admit.

"12. To these propositions we now request your assent, and on obtaining it we shall proceed to carry them out. If you should so desire, we shall be ready to submit for your approval the draft of the legislative enactment which will be necessary for establishing the new system of weights.

(Signed) JOHN LAWRENCE.
W. R. MANSFIELD.
G. N. TAYLOR.
H. S. MAINE.
JOHN STRACHEY.
R. TEMPLE.
H. W. NORMAN.

Papers sent to Board of Trade by Secretary for India.

Copies of these Indian papers were forwarded to the Board of Trade by the Duke of Argyll, Secretary for India, together with a letter dated February 6, 1869, in which he requests to be favoured with the opinion of the Board of Trade as to the proposed reform of weights and measures, and whether any measure is under consideration for a change in the weights of this country. A copy of a minute of Mr. H. T. Prinsep, a member of the Council for India, dated 30th December 1868, was also transmitted.

Mr. Prinsep's minute of 30th Dec. 1868.

Mr. Prinsep does not accept the proposals either of the Committee or of Colonel Strachey. He considers that each has shown conclusive reasons for rejecting the scheme of the other, which attempts to impose a new and unknown system amongst the people in the various regions of India. He looks upon the whole matter simply as an Indian question, and that what the population of India really require is merely a rectification of their own weights for their internal transactions, without reference to any assimilation with those of Europe for the convenience of foreign trade. He especially finds fault with both parties that they disregard what has been already done towards supplying the people of India with a uniform unit of weight; and that although the *tola* of 180 grains established by Government regulation in 1833 is mentioned by them, they have in no way adverted to the important practical mode adopted to carry out that regulation, viz., the coining of a rupee of that exact weight, of which nearly 2,000 millions of pieces have been struck and are now everywhere in circulation, as well as available for the test and comparison of weights in use throughout India. The universal use of the current coin as the basis of weights used throughout India has thus been entirely ignored.

Objects to Mr. Bayley's and Col. Strachey's schemes.

He proceeds to state the manner in which the *tola* weight of 180 grains was established and the reasons for its adoption, referring to the information upon the subject contained in Dr. Kelly's Cambist. It was found that the diversity of the existing local weights was caused by their being based upon the different coins current in the several localities. The first step therefore was to introduce a uniform currency, and the rupee weighing 180 grains was fixed upon in order to supersede the Calcutta sicca rupee and all other similar local coins. The old sicca rupee weighed very nearly 180 grains. It contained 175·923 grains of pure silver and only about 4 gr. of alloy. 80 of these Calcutta rupees made a *seer*, and 40 seers the *bazaar maund*, commonly used for grain, although another maund, called the Factory maund, $\frac{1}{10}$ less than the bazaar maund, was also in use by the Company's officers. In 1816 the Court of Directors established a new standard for the silver coin of $\frac{1}{12}$ alloy, in lieu of the existing more pure coin. By this change the Calcutta rupee of the same intrinsic value became increased in weight from 179·666 gr. to 191·916 gr.; but no corresponding change was made in the seer and maund, the weight of which remained based on the old rupee. The legal establishment of the rupee tola of 180 grains practically restored the old relations between the rupee, seer, and maund.

Advocates continuance of rupee weight unit.

In attempting to reconcile this Indian system with the English system, Mr. Bayley proposed to make the seer equal to 78 tolas, which, allowing for a little wear of the rupees, would make it exactly equal to 2 lbs. avoirdupois. Mr. Prinsep thinks this proposed loss of $\frac{1}{40}$ in the weight of the seer, now so extensively used in Bengal, a loss which would fall wholly on the buying consumer, to be the fatal mistake in Mr. Bayley's scheme.

Mr. Prinsep believes that the Council will never consent to the rejection of the rupee unit of weight thus established for 33 years, in a hope of finding a better by adopting one from either the Imperial or Metric system, although he admits and laments the extensive use of the factory maund in the indigo and opium trade, the dealers in which refused to accept the new maund. He considers, however, this opposition to be a strong argument against the attempt to introduce another new system of weights into India.

His opinion is therefore that the Council should reject both the schemes of the Central Committee and of Col. Strachey, and maintain the rupee tola as the unit of weight, with the seer of 80 tolas, and the maund of 40 seers in Bengal and Hindostan, any other multiple or subdivision of this unit being introduced and legalized that may be locally required.

He observes that the maund based upon the tola exactly equals 100 lbs. troy, though neither it nor the seer can be brought exactly to correspond with avoirdupois weights; and that 8 tolas are also equal to 3 oz. troy, and 2 seers to 5 lbs. troy. He points out that a simple mode might have been found to assimilate the weights based upon the tola with avoirdupois weights, by reducing the weight of the rupee to 175 grains and leaving it at the same value; that is to say, if the rupee contained 165 grains of pure silver

as now, with only 10 grains of alloy instead of 15, 80 tolas of 175 grains each would give 14,000 grains, or exactly 2 lbs. avoirdupois. But it is now too late to make the change, with the vast amount of rupees now in circulation.

The establishment of the rupee as the unit of value and of weight in India, to which Mr. Prinsep refers, was effected under Regulation VII. of 1833, under the advice, as is understood, of his brother, the late Mr. J. Prinsep, Master of the Mint at Calcutta, and distinguished for his scientific attainments. His tables of coins, weights, and measures in India, appended to the Journal of the Asiatic Society, afford much useful information on the subject.

With respect to Mr. Prinsep's proposal to retain the existing weights based on the rupee, attention may be drawn to Col. Strachey's statement, on the other hand, that even if the reform of the Indian weights is to be based upon any now existing, yet practically "almost the whole of the weights in actual "use would have to be replaced by new ones, what-"ever plan might be adopted. Even if the British "Government seer and maund were taken as the new "standards, this would hold good; for although their "use is no doubt more general than any other des-"cription of weights, yet *it is in fact very limited* "*when we regard the whole extent of British India.*" He adds with respect to the existing Government system of weights, established under Regulation VII. of 1833, "Following the old native idea, it is based "on the rupee coinage. Even as a system for per-"manent use exclusively in India, there would be "but little to recommend it; but no serious attempt "has ever been made to bring it into use in the "country at large, and it may in general terms be said "to be unknown out of the chief towns near which "a large English society has grown up."

As further evidence of the limited extent to which the use of the Imperial Indian system of weights and measures, based on the rupee, is now confined, and of the hopeless diversity of the existing weights used in India, it may be sufficient to quote from Mr. C. Gover's "Indian Weights and Measures, their Condition and Remedy," published in 1865. He says that the Assay Master at Bombay reports upwards of 70 different rupees current in that presidency differing from one another in weight from 192 grains down to 72. Mr. Gover states that he has, in addition to these, upwards of 300 different rupees of various weights, all of which are either in circulation or have been during the last 40 years, *every one of these weights being the tola weight of some particular district or village.* As regards the *seer*, he next enumerates 266 places where the seer varies from 24 to 140 tolas. At 15 of these places, including Calcutta, a seer is 80 tolas; at Madras the seer for Government purposes is 120 tolas. Mr. Gover also quotes the words of a Government order: "*The seer is liable, according to the* "*pernicious system hitherto prevalent, to vary in* "*weight for every article sold, as well as for every* "*market.*"

But in truth, even if such a system of weights based upon the new rupee were actually in general use throughout India, no system could be worse founded. In the first place, the weight of 180 gr. is much too small for a unit of weight. Any error must be multiplied 80 times in the seer and 3,200 times in the maund. Nor is any silver coin, even when new, a strictly accurate test of weight, as Dr. Shekleton, the acting master of the Calcutta Mint, states in his evidence (s. 15). He adds, "There is a mint remedy "allowed for possible errors of $\frac{5}{10}$ grain in each piece, "plus or minus standard. With respect to coins in "circulation, such a test would prove less reliable, "the loss in use being at times very great, though it "should not exceed 2 per cent., as a rupee ceases to "be a legal weight when the loss amounts to 3·6 "grains." He is not aware of any procedure by which rupees are authoritatively withdrawn from circulation, and states that the actual loss on worn rupees brought to the Mint for recoinage is from 2·5 to 3·5 per cent., but if fraudulently depreciated, he has known the loss amount to 11·5 per cent. This evidence appears to be conclusive in condemnation of a system of weights based on this silver coin.

If these be valid objections to Mr. Prinsep's views, and the existing system of Indian weights be based on a radically bad foundation, it remains only to consider the points referred to the Board of Trade by the India Department:

1. The mode of reform proposed in the printed papers from India, whether the new system should be based on Imperial or Metric units.

2. Whether any change is contemplated in the weights of this country.

Opinion on Indian question necessarily deferred till general question considered.

The decision on these two points really depends as already stated, upon that of the general question whether or to what extent the Metric system is to be introduced into this country. The consideration of this last question has in fact been suspended in Parliament, with whom the actual decision rests, until the Standard Commission shall have enquired into it, and reported their opinion; and the time has now arrived to lay before the Commission all the information that can be obtained upon this subject, and for the Commission to deal with it to the best of their judgment.

In the meantime, it cannot be doubted that if the opinion of the Commission should be in favour of the legal introduction of Metric weights and measures into the United Kingdom, and the same view should be taken by the Government, the result must be very favourable to the introduction of the Metric system of weights into India, as proposed by the Indian Government. How far it may tend to make it expedient that the change should be extended to the introduction of Metric measures as well as weights, and how far the means exist in India for practically carrying out such regulations as may be requisite for the substitution of Metric for Indian weights and measures throughout India, will be best answered by the Indian authorities, whose local experience and knowledge enable them to arrive at a more satisfactory decision.

II. Introduction of the Metric System into other Countries, more especially the Territory of the North German Confederation, and the United States of America.

Information contained in Report of Weights and Measures Committee at the Paris Exhibition, 1867.

The following information respecting the various countries which have adopted the Metric system of weights and measures, either wholly or partially, is mainly taken from the "*Rapport concernant l'Uniformité des Poids et Mesures,*" by the Committee of Weights and Measures and Coins, at the Paris Exhibition of 1867. This report is dated 15th June 1867, and was drawn up by M. H. de Jacobi, Member of the Imperial Academy of Sciences at St. Petersburg, Chairman of the Sub-Committee for Weights and Measures. It was unanimously adopted by the General Committee, and is signed by the president L. Matthieu, *Membre de l'Institut de France, et du Bureau des Longitudes.*

List of countries who have fully adopted the French Metric system;

The states who have completely adopted the French Metric system, and made its use compulsory, are stated to be—

France.	Spain.	Brazil.
Belgium.	Portugal.	New Granada.
Holland.	Greece.	The Southern
Italy.	Mexico.	Republics of
The Pontifical States.	Chili.	South America.

To this list the North German Confederation should now be added.

and of countries who have partially adopted it.

The countries in which the Metric system has been partially adopted are—

Great Britain and Ireland, in 1864; so far as to render contracts in terms of the Metric system permissive.

The United States of North America, in 1866; the Metric system being legalized concurrently with the old system.

Switzerland, in 1856; the unit of length being the foot of 3 décimetres, with a decimal scale. The unit of weight is the pound of 500 grams, with two distinct scales of multiples and parts; one decimal, the other according to the old custom.

Sweden, in 1855, by a law made compulsory in 1858; they have a system of weights and measures with a completely decimal scale, but the unit of length is the foot of 0·297 metre, and the unit of weight the pound of 0·42 kilogram. This system was substituted for the old system having the same units, but without the decimal scale, and with several series of measures of capacity according to the nature of the articles to be measured. This old system is still more or less in use.

Grand Duchy of Baden. The Baden foot is 3 décimetres, subdivided decimally. The measures of capacity are on a decimal scale. The pound is 500 grams.

The Hessian foot is 0·25 metre, with a decimal scale, with which the measures of capacity accord. The pound is 500 grams.

Bavaria, Wurtemberg, and Denmark have only adopted the Metric system so far as the pound of 500 grams, and Bavaria allows it only at the custom houses. In Denmark the pound is divided into 100 *quints*, and each *quint* into 10 *orts*; and since 1863, the use of the greatest part of the multiples of the pound not conformable to decimal division, has been prohibited. The subdivisions of $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, &c. are only tolerated, but new weights of this description are not allowed to be stamped. As to measures of length, the unit is the Rhenish foot divided into 12 inches, and the inch into 12 lines.

In Austria, the unit of length is the foot of 0·316 metre, and the unit of weight for commerce is the pound of 560 grams. The scales are neither decimal nor simple in their relations. But in 1853, the Austrian Government adopted a pound of 500 grams, with decimal divisions, for Customs and fiscal purposes. In the report of the Paris Committee, it is added that steps were then being taken in Austria for a change in the system of weights and measures, and that a project of law for the introduction of the Metric system would soon be presented for the decision of the Reichsrath.

Information has also reached me that the Metric system was introduced into Roumania by a decree of Prince Couza in 1864. In the law of 4th May 1867, for regulating the currency of Roumania, which was modified by adopting the principles of the monetary convention of December 1865 between France, Belgium, Italy, and Switzerland, the weights and dimensions of the coins are expressed in metric quantities. (See Appendix XVII. to Report on International Coinage, 1868.)

Other European countries where it is not introduced.

Norway had a system of weights and measures, presenting no relation to the Metric system either in the units or decimal scale. But by the law of 12th May 1866, the use of the French decimal Metric system is prescribed for medicinal purposes.*

The weights and measures of the countries bordering on the Mediterranean, viz., Turkey, Egypt, Morocco, and Tunis, have generally no relation with the Metric system. The unit of Turkish measures of length is, however, stated to be exactly equal to 0·75 metre.† The Paris committee considered that if other nations adopted the Metric system, its use would become general on the coasts of the Mediterranean, and that great advantages to the commerce of this part of the world must be the inevitable result.

Its proposed introduction into Russia.

Russia possesses a uniform system, exclusively used throughout the whole empire, with hardly an exception. The measures of length correspond exactly with the Imperial system, the *sagène*, the unit, being equal to 7 English feet. This is divided into 3 *archines*, the *archine* into 16 *verchoks*, &c. The sagène is also divided exactly into 7 feet, and each foot into 12 inches, &c. The measures of surface and capacity are expressed by squares and cubes of the measures of length. In practice, the measures of capacity for liquids are distinguished from dry measures, there being two distinct series. The unit of weight, the pound = 0·40952 kilogram, is the weight of 25·019 cubic inches of pure water weighed in a vacuum at the temperature of 16°·66 Cent. The multiples and parts of these units are in a scale of simple ratios but not decimal.

With such a system, which in itself is well regulated, but quite different from the Metric system, M. Jacobi considers that any reform made should be a radical one. Such a reform has many advocates in Russia. There were laid before the Paris committee a report from M. Kupffer, and various other reports from the Academy of Sciences at St. Petersburg, in favour of the introduction of the Metric system; and it would appear that, so far as regards this change in her system of weights and measures, Russia awaits only the example of those countries with which she has commercial relations, and especially of England, whose standard yard has served as the basis of the unit of Russian length.

Report M. Ku &c.

Of the reports of M. Kupffer and others here alluded to, one,† dated 10th June 1859, was addressed to the physical-mathematical class of the Imperial Academy of Sciences, at St. Petersburg, with reference to the invitation addressed to the Academy to combine their efforts with the British branch of the International Association for uniformity of weights, measures, and coins throughout the world. The report deals with the subject as regards the internal interests of Russia, and states in detail the several weights, measures, and coins of Russia, and shows not only that no definite relations exist between them and those of the French Metric system, but that if such relations were even to a certain extent established by altering the Russian units, it would be difficult to reconcile the public to the change. They, however, propose a scheme by which this change might be effected, retaining the old Russian nomenclature. But they conclude with expressing their opinion that it would be better to do either all or nothing, and that the French Metric system of weights, measures, and coins should be at once adopted.

Another report‡ is addressed to the Minister of Finance by M. Kupffer, as delegate from Russia to the meeting of the British branch of the International Association at Bradford on 10th October 1859, and it accordingly takes an international view of the question of the Metric system, stating its progress in the different countries where it has been adopted, and advocates the adoption of the Metric system in Russia in the following words:—

"Il serait fort utile pour le commerce, l'industrie, et pour l'avancement des sciences en Russie, si l'on établissait des relations simples et décimales entre toutes les parties de notre système des poids, mesures, et monnaies. Ce but serait complétement atteint, si l'on adoptait en Russie le système des poids, mesures, et monnaies, dont la base est le mètre, système adopté actuellement en France, et aussi entièrement, ou en partie, dans plusieurs états de l'Europe. Ce serait en même temps contribuer puissamment à l'uniformité si désirée des poids, mesures, et monnaies dans tout le monde."

Attention may also here be called to M. Kupffer's valuable official report upon the weights and measures of Russia which he drew up in 1841 as a member of a commission appointed to revise them. The "Travaux de la Commission pour fixer les mesures et les poids de l'empire de la Russie" are contained in two quarto volumes, and they include copies of many official papers relating also to the weights and measures

* *Exposition Universelle de 1867 à Paris. Comité des poids et mesures et des monnaies. Rapports et Procès-verbaux. Paris. E. Dentu, p.* 128.

† This statement requires some modification. The unit of length in Turkey is the *Pic*. But there are two of these measures in use, for different commodities, and varying about an English inch in length, and each again varies in length in different localities. The average length of the Pic appears to be a little less than 27 inches, and it is generally reckoned in trade to be equal to three-quarters of an English yard. From the Turkish standards officially sent from Constantinople to Russia, Kupffer found in 1841 the *Pic*, or *Endazeh*, used for cotton and similar articles, = 25·69 inches, or 0·65 metre; and the *Archin*, used for woollen goods, = 26·9 inches, or 0·68 metre. But these measures differ somewhat in their length in Egypt and other parts where they are used.

‡ "*Rapport adressé à son Excel. le Ministre des Finances, par A. T. Kupffer délégué de la Russie, à la reunion de Bradford, du 10 Octobre 1859.*"

† "*Rapport de MM. les Académiciens Ostrogradski, Jacobi, et Kupffer, rapporteur.*"

of other countries, and tables of their Russian equivalents.

With respect to the introduction of the French Metric system into other countries which have adopted it, it may be useful to refer briefly to the mode in which it has been introduced into some of those countries, and the period of its introduction, as stated in the Seventh Report of the British International Association, and more particularly also in the official papers appended to the Report of the Decimal Coinage Commission, 1857; and to state in greater detail the proceedings which have led to its adoption by the more important countries of the North German Confederation and the United States of America.

Belgium.

The Metric system was introduced at an early period into Belgium by the French Government, when they took possession of this country, and was made obligatory by a decree of 21st Sept. 1801. The French nomenclature was also then adopted, but on the union of Belgium with Holland the names were changed for the old names by the law of 21st August 1816. When Belgium became an independent kingdom, the French nomenclature was resumed by the law of 18th June 1836. By the new Belgian law of 1st October 1855, duplicates of the units of the Metric system were added to the French decimal series, which had previously included doubles and halves of the units. For a long period after the legal introduction of the Metric system, it is stated that the old system of weights and measures continued exclusively to be used, and that it was still very much used up to 1857, when more strenuous measures were taken by the Government to enforce the law.

Holland.

In 1816, Holland adopted the Metric system, to come into force three years later, in 1819. The old Dutch names were retained, the prefix of "old" or "new" being used to distinguish the nearest equivalent to old weights and measures from those of the Metric system. The law requires the use of the Metric system in all things except weighing medicines. Up to 1857, the old system of weights and meaures was very generally used in all transactions of a retail description.

Italy.

The whole of Italy, including the Pontifical States, has now adopted the Metric system as established in France.

Spain.

The Metric system was adopted in Spain by the law of 19th July 1849, to come into force throughout Spain from 1st January 1859, though for a portion of the kingdom it came into force in 1853. It has been extended to Spanish America and Cuba. The French nomenclature is adopted with the Spanish termination, as *metro, litro,* &c. It appears to be only permissively adopted, the old Castilian system being still largely in use. But the Spanish Government promote the use of the Metric system, and its use is stated to be on the increase.

Portugal.

By a law of 14th December 1852, the Metric system was declared to be compulsorily established in Portugal after ten years. A commission was appointed to make all the necessary arrangements. The result of their labours was, that by a decree of 5th June 1859, the Government directed the new system, in regard to linear measures, to commence from 1st January 1860, and by a further decree of 20th September 1860, the new system of weights was to commence from 1st July 1861.

Greece.

The Metric system, with some modifications in nomenclature and quantities, was introduced into Greece by the law of 28th September 1836. The nomenclature is Greek. The British vice-consul stated in 1856, that this law had never been practically carried out, and that all commodities were bought and sold by the old Turkish measure and weight. This statement is confirmed by the last report from the Dutch consul in 1868.

Chili.

On 24th January 1848, the Metric system was introduced into Chili. Before that time the old Spanish system was in force.

Adoption of the Metric System by the North German Confederation.

Adoption of Metric system by North German Confederation actual established by law of 13 June 186

On July 20th 1868, some important papers were received at the Board of Trade from the Foreign Office, relating to the law for a change of weights and measures in the North German Confederation.

These were as follows:

1. Copy of a despatch from H.M. ambassador at Berlin, dated July 27th 1868, transmitting:

2. Report of the 11th Commission for regulating the weights and measures of the North German Confederation, dated 6th June 1868. Original printed copy in German, with a précis in translation by Mr. Lascelles.

3. Law of the 13th June 1868, for regulating the weights and measures of the North German Confederation, as determined by the Federal Parliament. Original printed copy in German, with a translation by Lord Brabazon.

4. Original copy in German of the "Nord Deutsche Allgemeine Zeitung" of 14th June 1868, containing a report of the discussion on the measure in the Federal Parliament.

Proceeding preliminary to its adoption.

The law of 13th June 1868 established the French Metric system of weights and measures throughout the North German Confederation. Before stating the details of these important papers, it may be desirable to give a summary of the preliminary proceedings which eventually led to this result, and to note their dates. The following statement is drawn up from the several official reports made from time to time, and herein-after referred to; original copies of which in German will be laid upon the table of the Commission for their inspection. Some of the most important of these papers have been drawn up by Herr Brix, the head of the Standards Commission at Berlin, and by whom they have been sent to me. Some others have been obligingly furnished by Mr. Yates, an ardent advocate for the introduction of the Metric system into this country.

Project in 1848, to adopt the kilogram as basis of German weights.

As far back as the year 1848, the Prussian Government entertained the project of submitting to the Parliament of the Germanic Confederation assembled at Frankfort, a draft of law for the introduction of a common system of weights and measures for the whole of Germany, and thus to supply a want long felt, and which had become especially urgent since the establishment of the German Zollverein in 1834. With this view, the government appointed a special commission, who, after careful consideration, came to the conclusion that a modified adoption of the French Metric system would be the best adapted to the special requirements of German trade. They recommended that the half kilogram should be the unit of weight, and the Baden foot the unit of measures of length, as well as the basis of superficial measure and measures of capacity, with decimal multiples and parts.

Suspended till 1866, when half kilogram pound legalized in Prussia.

A draft of law was drawn up to carry out this recommendation, which met with the approval of the Government, when the well-known political events at Frankfort obstructed its further progress. No further steps were taken in the matter for eight years, when the Prussian Government again interested themselves in the reform of the weights and measures, and by the law of 17th May 1856, established the zoll pound equal to half a kilogram as a legal commercial weight throughout Prussia. Nearly all the Governments of the States composing the Zollverein successively followed this example, though not in all cases without certain deviations in the subdivisions of the zoll pound.

Commission of experts at Frankfort, in 1861 for establishing uniform system in Germany

The further step was taken by the Diet at Frankfort, by a resolution of 16th June 1860, of convoking a commission of experts from the several states, who met accordingly at Frankfort in 1861, for the purpose of conferring on the question of introducing a uniform

system of weights and measures in Germany best suited to the wants of the country.

So far as Prussia at least was concerned, the question of weights had been in great measure determined by the legalization of the half kilogram in 1856. In addition to which, by Art. 8 of the German Post Union of 18th August 1860, the zoll pound of 500 grammes was declared to be the unit of weight for parcels sent through the Post Office, and from 1st January 1862, within the whole extent of the Post Union: it was divided uniformly into 30 loth, with decimal subdivisions. The system of measures of length therefore only remained to be dealt with, involving also superficial measures and measures of capacity, of which the unit of length is the basis.

The Commission was composed of the following members:

From Austria	-	Dr. A. von Ettingshausen, Professor of Physics, &c. at the University of Vienna, &c.
„ Bavaria	-	Dr. P. Jolly, Professor of Physics at Munich, &c.
„ Saxony	-	Dr. J. A. Hültze, Director of the Polytechnic School, and Vice-President of the Standards Commission in Saxony, &c.
„ Hanover	-	Dr. C. Karmarsch, Chief Director of the Polytechnic School at Hanover, &c.
„ Wurtemberg		Dr. F. von Steinbeis, Director of the Central Board of Trade, &c., at Wurtemburg, &c.
„ Baden	-	M. Becker Government Surveyor of Buildings, &c. at Carlsruhe.
„ Hesse	-	Dr. C. L. P. Eckhardt, President of the Hessian Polytechnic Society, &c.
„ Oldenburg		E. C. O. Lasius, Chief Government Surveyor, and Member of the Chamber of Finance at Oldenburg, &c.
„ Lubeck, Bremen and Hamburg.		G. Repsold, one of the Firm of A. and G. Repsold, Astronomical and Mathematical Instrument Makers, and Official Adjusters at Hamburg.

They held thirteen sittings, from 12th to 28th January 1861, and subsequently printed and published a full account of their proceedings.*

heir Report, 30 pril, 1861, ecommending the etric stem.

In their very detailed report of 30th April 1861,† the Frankfort Commission of Experts recommended the French metre as the unit of measures of length in Germany, with its decimal subdivision, and also proposed the adoption of the French nomenclature.

eferred by e Prussian overnment a Commission at erlin.

On 28th June following, this report was submitted by the Prussian Government to the Royal Commission for Trade at Berlin, that they might state their opinion how far it was expedient that the proposal of the Frankfort Commission should be carried out in Prussia. With the report, a copy of resolutions of the permanent committee of the German Commercial Diet, dated 7th July 1860, was also sent, and printed reports of the discussions of the Diet upon the subject, at their meeting in Heidelburg in May 1861, together with other printed papers, including two memorials from the Statistical Congress for promoting the general introduction of uniform weights, measures, and coin, dated respectively 27th August 1860 and 15th June 1861.

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In a Report‡ dated 28th September 1861, and addressed to the Minister of Commerce, &c., the Berlin Commission, from the Prussian point of view, decidedly negative any change in the established standard measures of length, which they state were acknowledged even in foreign countries to be determined with scientific accuracy. On the other hand, from a German point of view, and in order to facilitate trade and commerce, they admitted it to be desirable to take decisive steps to get rid of the existing diversity and confusion in the measures of length throughout the different states of Germany, and to establish a uniform standard.

To carry out the latter object, they state it to be self-evident from the greatly increased and increasing commercial and scientific intercourse between Germany, Great Britain, and France, that the choice lies only between the English and the French units of length. And they concur with the Frankfort Commission in their reasons for peremptorily rejecting the English measures. 1st. Because the English unit does not possess what they consider to be indispensably requisite, and of the utmost importance for technical calculations—a simple relation to the unit of weight. 2nd. In the want of a systematic scale in the measures of length, superficies, and capacity. They also quote and concur in the judgment of the British branch of the International Association, as stated in their memorial of 15th June 1861, that "a "sad confusion and total want of fixed principle "prevail in the English system of measures," and that in this respect "neither the law nor actual "practice of the country can be regarded as a guide "for any civilized nation." 3rd. They declare it to be clearly proved by official documents, as stated in the Frankfort memorial, that the foreign trade of England is carried on to a far greater extent with countries using the Metric system than with countries where the English system prevails.

For these reasons the majority of the Berlin Commission concurred in the proposition of the Diet's Commission, that the metre and its decimal scale should be adopted in Germany.

But Herr Brix, the member of the Commission, who drew up the Report, though generally favourable to the adoption of the Metric system, did not entirely agree to the whole metre being established as the unit of length. He considered it to be too long, and he argues the point at some length.

He objected also strongly against the introduction of the French nomenclature, and approve of the precedent of the Dutch Government, who legalized the Metric system in Holland from 1st January 1821, with the decimal scale but without the French names, and retained the customary Dutch names for the new metric weights and measures.

Also referred to provincial authorities Chambers Commerce, &c.

It would appear that before any further steps were taken by the Prussian Government, who continued earnest in their endeavours to introduce a uniform system of weights and measures throughout Germany, they referred the subject to the several provincial authorities, as well as to the representatives of commerce and other bodies; and fortified with their opinions, the Government finally decided on the adoption of the metre as the unit of German measure. Accordingly on the 2nd December 1863, the minister of commerce desired Herr Brix to give some further explanations on matters of detail, and to draw up a project of law to carry out the decision of the Government.

Second Report of Herr Brix, 20 Dec. 186

In his Report of 20th December 1863 Herr Brix reverted to his objection against the metre as a standard on the ground of its being too long, and urge the necessity of retaining, in addition to the metre, the Baden foot of ·3 metre, as a more suitable measure for trade purposes. As an additional recommendation, he stated that the Baden foot is only $\frac{1}{8}$ inch less than the Prussian foot; and very nearly equal to the English foot. He considered that no inconvenience could arise from adopting the metre merely for all purposes of international trade, whilst the foot measure was so completely identified with the habits of artizans that it would be difficult to eradicate it. As an analogous

* Protokolle der Commission über Einfuhrung gleichen Masses und Gewichtes in den deutschten Bundesstaaten. 37 pp. fol.

† Gutachten der Commission, &c. 86 pp. fol.

‡ A written copy, in German, of the Report has been transmitted to me by Herr Brix, its author. He sent similar copies of his further reports of 20th December 1863, and 16th June 1865, which will be alluded to in the sequel. Translations of these Reports have been made into English, and will be laid before the Commission.

case he mentioned that even in France, in spite of the penalties to which they were liable, the old Paris foot with its inches and lines, was commonly used in workshops. He also called attention to the fact that when the new half kilogram pound, the smallest unit for wholesale trade, was legalized in Prussia, the loth which had been commonly used in the retail trade from the remotest times, was preserved at nearly the same weight, and to this circumstance he attributed the ready acceptance by the country of the new pound weight.

Herr Brix further objected to some of the details in the proposals of the Frankfort Commission, with respect to the multiples and parts of measures of superficies and capacity, and insisted on the necessity of subdividing the litre decimally, instead of binarily, as recommended by them; and he concluded with expressing his opinion that a formal project of law could not be drawn up, until the points to which he had adverted should be definitely determined.

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Early in 1864, Prussia became engaged in hostilities in Denmark, and political matters being much disturbed, no further proceedings appear to have been taken with regard to weights and measures until the middle of the following year. A further report from Herr Brix, the Director of the Standards Commission at Berlin, to the Minister of Commerce, dated 16th June 1865, brought the subject somewhat nearer to a practical conclusion, by including a project of law for carrying out the proposals of the Frankfort Commission, and introducing the Metric system for Federal Germany. Both in the report and the project of law, Herr Brix adhered to his views that the metre should be established as the unit of length for international purposes and for foreign trade, whilst the established unit of the Baden foot =·3 metre should be the unit for internal trade. He adhered also to the German nomenclature.

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The political disturbances in Germany again intervened to prevent the settlement of this long agitated question. The short but decisive German war in the summer of 1866 was brought to a close by the signature of a treaty of peace at Prague on 2nd August; and on the 4th August, the plan of the North German Confederation was announced by Prussia.

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The first decisive step for introducing the Metric system into the Confederation was the passing of the law of 16th March 1867, for regulating medical weights. The detailed instructions for carrying out this law were contained in the official circular of the Minister of Commerce, &c., dated 29th August 1867, which was published in the State Gazette,* the gram being the unit of medical weight with decimal multiples and parts.

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The general question of the introduction of the Metric system was further referred by the Prussian Government to the consideration of the Chancery of the North German Confederation; and in June 1868 all these preliminary proceedings were brought to a rapid conclusion by the project of law being laid by the Prussian Government before the Federal Parliament.

We now come to the papers transmitted from Berlin to the Foreign Office, and forwarded to the Board of Trade, which require to be more fully noticed.

The following German printed papers were sent in original:—

1. Report of the Committee of the Federal Parliament on a project of law for the regulation of weights and measures for the North German Confederation.

2. Supplement to the *Nord deutschen Allgemeinen Zeitung* of 16th June 1868, containing a report of the general discussion of the Bill in the Federal Parliament on 13th June 1868.

3. Law of 13th June 1868, for the introduction of the Metric system.

The following is a translation of the first of these documents, which appears of sufficient importance to be given *in extenso*:—

* Copy of the *Königlich Preussischer Staats-Anzeiger*, 4th Sept. 1867, transmitted by Herr Brix.

Report of the Committee of Federal Parliament dated 6 Ju 1868.

The project of law for the regulation of the measures and weights in the North German Confederation having been referred by the Reichsrath, to whom it had been presented on the 13th May 1868, to a committee of 14 members, the committee have discussed the project in four sittings, two Commissioners of the Confederation, the Royal Saxon Privy Councillor, Dr. Weinlig, and the Prussian Privy Councillor Windhorn, attending, and they now submit the following report.

For a long time the German people have keenly felt the serious inconveniences arising from the great variety of measures and weights in use, and in proportion as the commercial intercourse between the various States of Germany was fostered and increased by the operation of the Zollverein, the necessity of removing these impediments has grown more and more imperative. Many proposals were made from time to time by private persons as well as by chambers of commerce, agricultural and industrial societies, &c., until at last a committee, convoked by the then German Diet, and consisting of Experts from Austria, Bavaria, Saxony, Hanover, Wurtemberg, Baden, Grand Duchy of Hesse, Oldenbourg, Nassau, and the Hanse towns, assembled in 1861 at Frankfort on the Main, for the purpose of considering the subject. On 30th April 1861, they presented they report to the Diet. The report (an abstract of which is annexed to the project of law) states in a clear and luminous manner the grounds upon which they especially recommended the Metric system. They gave, indeed, far greater attention and advocated a much more comprehensive reform of the existing system of measures than of weights, but it must be remembered that at that time most of the German States had just come to an agreement to introduce the new zollpfund (=½ kilogr.), and a further change might therefore have appeared inexpedient, especially as the German Diet possessed scarcely any power of enforcing their resolutions; indeed, the fate this very report experienced shows how difficult it was in those times to come to a speedy solution of even mere practical questions, for it was not until 1865 that a Committee was formed, consisting chiefly of plenipotentiaries of the before-mentioned States and of Prussia, when a project of law for regulating the weights and measures of Germany was unanimously adopted, which was based on the propositions of the report of 1861. Yet even this project was destined to be thrown aside for a time, in consequence of the political events of the year 1866, until at last it is now submitted, unchanged in any essential point, to the deliberations of the North German Parliament.

With regard to the expediency, or rather necessity of the speedy adoption of the Metric system, perfect unanimity prevailed between the members of the Committee, as it had previously existed in the Committees of 1861 and 1865. In the preliminary discussion of the general principles of the law, it was clearly shown that the state of things in relation to weights and measures had become more and more intolerable in Germany, and especially in the States of the North German Confederation.

The German people had a right to insist that, so far as possible, an uniform system of measures and weights should be used throughout the whole land. But this object could only be attained either through the adoption by all the States of the existing measures and weights of a single State, or by the introduction of an entirely new system. The first course would be attended with great difficulties, from the jealousies prevailing between the individual States. This ground of objection might have been insufficient if any of these States had actually possessed a really faultless system; but the objection must be held to be conclusive when it is acknowledged that such is not the case in any one State. On the other hand, if a new system had to be decided upon, it was obvious that none but a purely decimal system would fully meet all the practical requirements. As regards the French Metric system, the mere fact of its original derivation from the length of the meridian does not constitute its chief value, as the accuracy of the measurement has not only been

questioned, but confessedly given up. It may, indeed, be fairly assumed that such a so-called natural standard will always be found defective, according as the progress of science enables us to measure and calculate more accurately from time to time, thus involving a continual alteration of the material standard derived from it, whilst immutability must always constitute the fundamental principle of every primary standard measure. But in fact, what from the first moment ensured to the Metric system not only pre-eminence over all other systems, but also its gradual progress towards being adopted as an universal system, has been solely the simple and yet ingenious idea of assimilating its scale to that upon which our system of numeration is based. It is no conclusive objection that the number 10 can only once be divided by 2 without leaving fractions, and that when divided by 3, it gives no finite result. This defect no doubt is to be regretted, and the superiority in this respect of the number 12 may be readily acknowledged. So long, however, as the very important step of basing our whole system of numeration upon the number 12 remains unaccomplished—and probably it will never be so much as attempted—it is clearly right to base our entire system of measures, weights, and it may also be added monies, on the number 10. But the more the immense advantages are recognized which result from the use of the decimal system in all the transactions of common life as well as in the pursuits of science,—as a practical illustration of which an Englishman has endeavoured to show that the general introduction of the decimal system would save the children in school a year's study,—the more important must it be deemed that these advantages should be secured in their fullest extent upon the introduction of a new system of weights and measures, and the more necessary that no mere half measures should be adopted.

However willingly, therefore, we acknowledge the great step in advance which the present project of law makes, we cannot, on the other hand, shut our eyes against the fact that to preserve the zollpfund as basis of the system of weights must materially impede the advantageous results to be looked for in the new system. The consideration of this point may, however, be left for special discussion, and we confine ourselves at present to the expression of our conviction that the advantages of a strictly decimal system are so great, as to render its adoption imperative upon us, even if we should be the first to do so, and no probability existed of any other State following the same course. But what is the actual state of things with respect to this question throughout the world? The Metric system is at this day in full operation in France, Belgium, Holland, Italy, Spain, Portugal, and Greece, even in part of Germany (the Bavarian Rhine-Palatinate), while it is at least permissively introduced in England, Switzerland, and the United States, with every prospect of being finally adopted in these countries. Thus, in fact, the question can no longer be *whether*, but only *when* the Metric system shall be introduced amongst us?

The reply is easy to give; it should be—immediately! Every day we in Germany continue to use the old, bad, and, above all, hundredfold diversified measures and weights, is a loss to the national wealth. The Metric system once introduced, we should obtain not only all its advantages in the transactions of internal trade, but also facilities that can scarcely be over-estimated in our foreign commerce with France, Italy, and other countries which have adopted the Metric system. Much, indeed, has been lost by the delay which has occurred since 1861, but if the new system is to be adopted at all, it must be introduced in its full integrity; any half measure now must necessarily lead in a short time to further changes, and consequently new annoyances to the public.

The introduction of the zollpfund in 1856 may be held up as a warning in this respect. The great inconvenience and cost of its introduction will be in every one's recollection; all was willingly borne because it was universally acknowledged to be a real step in advance, the new pound being exactly equivalent to a half kilogramm. But if instead of this half step, the whole step had then been taken of adopting the French kilogramm as unit of weight, we should have been saved the present necessity of once more changing our weights. It is true that the project of law attempts to palliate the evil by retaining, and indeed perpetuating the zollpfund, so far as such regulations for all future time can be relied upon. Supposing, however, even this end to be attained, the pound alone would be saved, not the *loth* and all the other weights, which at all events must be altered.

It may be instructive to review the harm produced by the measure of reform not having been more comprehensive in 1856. Instead of simply adopting as the unit of weight for the Zollverein, the kilogramm with strictly decimal divisions, the half kilogr. was deemed sufficient; but this unit, when adopted, was differently subdivided in the several localities, by virtue of the so-called legitimate authority of each State. The result may be shown by arranging the States of the Zollverein in three several groups. The zollpfund was subdivided into 30 loth in Prussia and Saxony; into 10 loth in Hanover, Oldenburg, and Hamburg; and 32 loth in the rest of the Zollverein! To those who at the time advocated the entire adoption of the kilogramm, it was objected that it differed too much from the unit of weight in common use, and that it was desirable to approximate the new pound as closely as possible to the old one. Now the truth lies just the other way. The transition from one weight to another is much easier when the new weight differs so greatly from the old as to preclude the possibility of confounding the one with the other. Thus the old pound of 28 loth weight has doubtless often been confounded with the new pound of 30 loth, but certainly never with the kilogramm of 60 loth. Nor will a new name be in any way detrimental, but rather advantageous. For all these reasons it is greatly to be wished that the opportunity once lost may now be retrieved. The transition will, in fact, be much easier at present, because the zollpfund will continue to be a perfectly legitimate weight as a half kilogramm; so also the zollcentner = 50 kilog., and the 20 pound weight = 10 kilog. Besides, as all subdivisions of the pound must be made anew, it is incumbent upon the Legislature to take every step for at once securing the best possible unit of weight. That which is best not only in itself, but also for the sake of conformity with the other countries who have adopted the Metric system, is simply the gramm as a unit.

Here we cannot refrain from stating that it appears to us to be of equal importance, as forming, so to say, the key-stone of the whole edifice, to reconstruct the monetary system upon the same principle as the system of weights and measures. This question, however, as well as another similar one, may be reserved for a special resolution at the conclusion of the report.

As no difference of opinion arose amongst the members of the committee as to the views thus put forth, they at once passed to the special consideration of the project of law.

The principle embodied in Art. 1 was unanimously agreed to.

Art. 2 and 3 of the Government project were also agreed to. It was suggested that in order to prevent deviations from the standard measures and weights, accurate copies of the primary standards should be deposited in several of the large commercial towns, and be carefully re-verified about every 10 years. The two Federal Commissioners considered that regulations of that kind should not be neglected, and especially any that were calculated to ensure the correctness of the copies, as well as their easy accessibility, due precautions being taken against any risk of damage to their accuracy.

In order to remove all possible doubts, in even the very strictest construction of the law, the Committee further declared that though a bar of platinum exceeding the true length by a minimum quantity may have been fixed upon as the primary standard measure of

mechanical means, yet the true (ideal) standard length, and a kilogramm of platinum a minimum quantity in deficiency as the primary standard weight, perfect accuracy being unattainable by our present measure of length and of weight should be the legal meter and the legal kilogramm.

In considering Art. 4 of the Government project, it was fully and readily admitted by several members that its provisions were sufficient to meet all essential exigencies in reference to the unit of measure, and especial commendation was bestowed on the fact that the whole of the French scale of decimal multiples and parts had not been adopted, but that kilometers, meters, centimeters, and millimeters had been deemed sufficient. It was thought that no practical advantage whatever resulted from interposing the decimeter between the meter and centimeter; and even the French, although they include the decimeter, generally use only the meter and centimeter, the numbers from 1 to 100 being familiar even to the most unpractised accountant.

This commendation, however, was not acquiesced in on all sides, some members thinking it expedient that the decimeter should be interposed between the meter and the centimeter, and still more desirable that the public should not be compelled to mount at once from the meter to the kilometer. A leap from 1 to 1,000 appeared decidedly too great, and at least one intermediate step of the dekameter or 10 meters to be requisite.

By way of explanation the Federal Commissioners remarked that Art. 4 was not to be understood as establishing as legal those measures only which were specified therein, as the whole series of decimal divisions and multiples of the meter are expressly mentioned in the first part of the Article, and those measures only were specified in the remaining part which were more generally used; it being implied that the use of other measures was in no way prohibited, provided they were included in the decimal scale. The majority of the committee consequently came to the conclusion that the decimeter should not be specially named, but that between the third and fourth sentence the words be inserted—

"Ten meters are called a dekameter."

One member expressed a doubt whether the hectare might not prove too large as a land measure, as it contains about four Prussian morgens, and he suggested that between the hectare and the are, one more superficial measure might be interposed. It was, however, replied, that a progressive ratio from 1 to 100 had been admitted to be not too great, and that it was much more inconvenient to divide the morgen into 180 square rods, and the latter into 144 square feet, than the hectares into 100 are, and the latter into 100 square meters, whereupon the amendment was not pressed.

An amendment was then moved to omit the words "as land measures" after the sentence relating to the are and hectare, and the words "as measures of capacity" after the sentences relating to the liter and hectoliter. It was argued that these words were quite unnecessary. Although the are and hectare were generally used as land measures, and the liter and hectoliter as measures of capacity, yet streets, building grounds, rooms, &c. could be measured by the are, and a hectoliter was understood to be the tenth of a cubic meter, whether used for liquids, or for stones, sand, wood, &c. This proposal would also render unnecessary the introduction of special measures for fire-wood. At all events, the additional designations "land measures" and "measures of capacity" were at least superfluous. The Committee recognizing the justness of these observations, agreed to strike out the words.

Lastly, exception was taken to the new measures being designated by foreign names, difficult to be understood by the people. Instead of introducing French names, it was desirable to use German words. To this it was replied that the German people would understand these names as easily as the French learnt them. After all they were not French words, but were derived from the Greek and Latin. Whether classical or not, it had been at any rate of some practical advantage to designate the parts by Latin, the multiples by Greek names. The expressions meter, liter, gramm were sufficiently simple; and words which appeared long, such as centimeter, would be learned as easily as the German words centner or percent had been. Should, however, any necessity arise for German terms besides the abbreviations likely to be used, such as kilo instead of kilogramm, the public no doubt would soon find them for themselves. It did not appear advisable to devise new names, and to impose them by law. The whole Art. 4, with the above-stated modifications, was then unanimously adopted.

Articles 5 and 6 of the Government project contain provisions relating to the dimensions of a ruthe or rod, a morgen, a klafter, and a mile, and purporting to establish a certain relation between these measures and those of the Metric system, without, however, altogether attaining this object. Several members raised the question as to the necessity of such measures, after the adoption by Art. 4 of all the decimal Metric measures. They contended therefore that both articles ought to be rejected, or at any rate that Metric equivalents should be found for these German denominations; for instance, 10 meters = one *ruthe* (rod), or *neuruthe* (new rod), or *kette* (chain); 2,000 square meters (not 2,500) = one *morgen* or new morgen; 10,000 meters = one new mile or *myrie*. The Federal Commissioners recommended the adoption of the *ruthe* of 5 meters and the *morgen* of 2,500 square meters or 100 square rods, on the ground that the hectare would prove, as many appre hended, too large for ordinary superficial measurements. It was replied that in such cases the are would be a very convenient measure, and for larger measurements of landed estates, the hectare. The Commissioners admitted that the ruthe could well be dispensed with, more particularly as the dekameter had been inserted in Art. 4. With regard to the mile of 7,500 meters, as proposed by Art. 6, they stated in explanation that this was about the mean of the measures of distance hitherto in use; that it had already been actually introduced in Saxony and Hesse; and, lastly, that it formed the basis of the calculations of the North German Railway Company. It was urged, on the other hand, that for these very reasons people would be more exposed to the error of confounding the new mile with the old, the former being now quite unknown in the greater part of Germany; that measurement by kilometers was perfectly sufficient, considering that even Russia, notwithstanding her enormous distances, was satisfied with wersts; and that at all events the Metric system included a long measure of distance in the myriameter (or about a myrie) of 10 kilometers. Under these circumstances to introduce also a mile of $7\frac{1}{2}$ kilometers would be not only useless but positively hurtful.

The Committee, concurring in these views, decided on the omission of Articles 5 and 6.

Art. 7 of the Government project proposes the pound (zollpfund = one half kilogr.) as the unit of weight, to be divided into 500 grammes, thus abandoning the decimal system. This course was warmly opposed in the Committee. The arguments brought forward in the general discussion were reverted to, and again unanimously concurred in by the Committee, and were embodied in the following amendments;—

"Art 7 (now 5) to be as follows:

"The kilogramm is the unit of weight.

"The kilogramm is the weight of a liter of distilled water at + 4° of the Centigrade thermometer.

"The kilogramm is divided into 1,000 gramms, with decimal subdivisions.

"Ten gramms are called a dekagramm.

"The tenth part of a gramm is called a dezigramm, the hundredth part a zentigramm, the thousandth part a milligramm.

'The ton is equal to 1,000 kilogramms."

Whilst the committee were unanimous in adopting the kilogramm as the unit of weight,—for although the *gramm* may be formally constituted the unit in the French system, yet on practical grounds it is considered too small for the fundamental weight,—the question was raised whether it would not be expedient to designate the kilogramm by the German name of double pound, as it is in reality the double of the zollpfund. But independently of the fact of the zollpfund being historically the later weight of the two, so that it would be more proper to say that the zollpfund is the half kilogramm than that the kilogramm is the double pound, it was not deemed advisable to adopt this expression, as it was the object to subdivide the kilogramm decimally, and the very notion of the *unit* of weight would be lost by the expression *double* pound. Indeed, if the pound ceased to be the unit of weight, computations could not in future be made by the zollcentner, as hitherto ; but it was not an object of any importance merely to save the zollcentner, when calculations could be made with equal or in fact with much greater convenience by the kilogramm. Every one will admit that in calculations it is easier to deal with 133 kilogramms, for instance, than with 2 centners 66 pounds. The introduction of a special denomination, such as "Metric centner" for 100 kilogr., may therefore well be dispensed with, and for the measurement of heavy loads it will be quite sufficient to have a weight of 1,000 kilogr., which may most appropriately be called a "tonne."

The Federal Commissioners fully admitted the force of the arguments as to the consistency of maintaining the kilogramm as a unit, and its practical convenience. Nevertheless they insisted that as the whole project of law was founded on the presumption that only such alterations should be made as were absolutely necessary, the proposal of abandoning the zollpfund certainly could not be allowed. The kilogramm, they contended, was a new quantity for the public, and would not easily become familiar to them. The retention of the pound no doubt constitutes a deviation from the pure Metric system, yet it appeared to be sufficiently justified by the motives of the framers of the project of law. The pound was especially intended to serve as a connecting link between the old system and the Metric system, standing, as it does, in close relation with the kilogramm, and it was thus thought to meet the wishes of the trade and of the public in general. The Commissioners therefore could not positively hold out the assurance that the Federal Council would acquiesce in the kilogramm being adopted in preference to the pound; but if the pound was once given up, the kilogramm would doubtless be the only possible unit of weight, as indeed the "kilogramme prototype" already constituted the primary standard; and practically it would be right to retain this greater weight as a unit, than to be misled by the nomenclature, and descend to the gramme.

On the part of the committee, it was replied that in preserving the pound as a unit the Federal Council had no doubt been guided by the best intentions and the desire to facilitate as much as possible the transition from the existing to the new system. But it should be borne in mind that by accepting now what was less advantageous, for the sake of smoothing down present difficulties, we should probably in a few years hence be compelled to go a step further, and fully adopt the Metric system. The consequence would be that the public would have a second time to undergo all the inconveniences and expenses of the change. Such, indeed, is decidedly the opinion prevailing throughout the country, as testified not only by the members of the Committee, as representing the people at large, but also by most of the petitions presented to the Chamber, especially those from commercial and agricultural districts. Attention should be drawn to the two great advantages which the kilogramm possesses over the pound ; first, the power of expressing all imaginable weights by *one single number*, thus doing away with all reductions ; secondly, the complete uniformity with the measures and weights of France, of all countries who adopt the Metric system.

The result was that the amendment was unanimously adopted, and, with the assent of the Commissioners, it was further decided as a better arrangement of the clauses, that Art. 3 of the Government project (Art. 4 of the project of the Committee), which treats of the primary weight, should be placed after Art. 4 of the Government project (now Art. 3 of the project of the Committee).

Arts. 5 and 6 having been omitted, the numbers of the remaining articles were consequently changed. Those herein-after stated are the numbers of the project of the Committee.

Art. 6 was adopted without opposition, attention being, however, drawn to the circumstance that in retaining the original text after adoption of Art. 5, the medicinal weight became changed in regard to the pound, the lesser weights remaining unaltered.

Art. 7. The gramm was considered to be also pre-eminently adapted as a weight for gold, silver, pearls, and jewels. With regard to money, the weight as fixed in the Monetary Convention of 24th January 1857 is to remain in force so long as the convention lasts, it being binding upon us for the time of its duration. Art. 7 was consequently proposed to run as follows:—

"With respect to the weight of coin, the provisions "of Art. 1 of the Monetary Convention of 24th "January 1857 remain unaltered."

These words were unanimously adopted.

Arts. 8 and 9 were adopted without alteration. The question having been raised whether in the meaning of Art. 9, drinking vessels used in liquor shops must be stamped, the Federal Commissioners explained that such was not the intention of the Bill ; such a regulation as the stamping of every vessel of the kind would scarcely be practicable. It was, however, left to the discretion of the police, or to the legislature of each separate State, to issue such local regulations in this respect as they might think fit. The Committee declared themselves satisfied with this explanation.

Art. 10 was adopted.

Art. 11 was objected to by several members on the ground that the capacity of wooden casks, especially after any repairs, was too variable to be subjected to compulsory verification. The consequence would be that the stamp from its untrustworthy character would tend more to mislead the public than to protect them from fraud. But one of the Federal Commissioners having explained that many of the wine merchants interested had petitioned in favour of the casks being stamped, and it had been ascertained that such also was the wish of wine growers, and on the other hand as it might reasonably be presumed that buyers would generally prefer casks to be stamped, the Article was adopted.

As also Art. 12 ; the Federal Commissioners, however, reserving to the Government the power of authorizing the stamping of gas meters other than of the Metric system, especially such as were already in use.

Art. 13 contains a provision which at first sight might appear objectionable, viz., that the quarter-hectoliter and the successive halves of the liter shall be allowed to be stamped. This provision, however, is justified by the convenience of the use of the quarter-hectoliter in measuring corn, the half scheffel, a measure nearly of the same capacity, being also very commonly used ; and again, as regards the liter and its subdivisions, by the requirements of the retail sale of liquor, a reason that induced the French to deviate in like manner from the strict system. The Committee adopted the Article and also the following.

Article 15 agreed to, with a verbal amendment.

Also Arts. 16 and 17, the latter after the Federal Commissioners in reply to a question had explained that fees for verification should be fixed upon the smallest possible scale.

Arts. 18 and 19 were adopted without discussion.

An amendment was proposed to Art. 20, by which the new law would take effect on the 1st January 1871,

a year sooner than the term fixed in the Bill. But the Federal Commissioners having pointed out the utter impossibility of completing all the preliminary arrangements any sooner, especially the construction of the great number of measures and weights with due regard to the accuracy required, the amendment was withdrawn.

The principle of Art. 21, permitting the use of the new measures and weights for a time previous to their legal introduction, with the view of facilitating their ultimate establishment, was fully approved by the committee.

Finally Art. 22 was adopted without debate, and thus the whole project of law was settled.

The committee then proceeded to consider the following resolutions referred to in the course of the preceding discussion :—

" That it may please the Reichstag to request the President of the Federal Council—

" 1°. To submit as soon as possible to the Reichsrath the project of a new and strictly decimal monetary system, with special regard to its being so framed as to offer the greatest possible guarantee for its ultimate extension, as an uniform international system, to all civilized countries.

" 2°. To endeavour to establish as a general regulation, by means of negotiations with those States which have adopted or may hereafter adopt the Metric system of measures and weights, that deviations from the commonly received system shall not take place except by mutual agreement of all the States interested."

The proposer of these resolutions stated as his reasons,—1, that the recognition of the great advantages attending the decimal system would of necessity lead to the full extension of the principle, by its application to coinage. Probably the best course to be taken would be to adopt the French franc with its subdivision into 100 centimes. It should, however, be remembered that there are still many difficulties in the way, chiefly with reference to the question of a gold or a silver standard, as to which even in France no definite conclusion has yet been arrived at.

Then, again, there were many advocates of the English shilling, being equivalent to 10 silbergroschen, and on this account considered preferable to the franc as an international unit. His resolution was therefore purposely so framed as not to prejudge these questions, and the two essential points only were proposed for deliberation, namely, first and chiefly, a strictly decimal scale, and, secondly, the favourable prospect which it afforded of being extended to a uniform international system.

As regards the second part of the proposition, it must be admitted by all that a system so excellent as the Metric system offers in itself a certain guarantee that when once adopted in any State it will never be given up again ; it may, nevertheless, be useful if, by means of a convention between all the States interested, a formal guarantee could be obtained for so beneficial a result as the continual maintenance of a complete uniformity of measures and weights, and so that it should not be endangered by the self-will or the separative tendencies of any single State.

The committee fully concurring in these views, the resolutions as proposed were unanimously adopted.

A great number of petitions had also been referred to the committee, in regard to which they adopted the following resolutions :—

Petitions No. 71, 99, 315, 356, and 46, emanating from various agricultural associations, concur in praying for the introduction of the entire system of French measures and weights, especially the kilogramm instead of the pound, and the hectar instead of the morgen. The committee declared that the prayers of these petitions were disposed of by the project of law.

Petition No. 105 asks that all wine bottles used in the trade shall be made to contain one liter, and all beer glasses used in the retail trade half a liter. The committee decided " to pass to the order of the day, " as difficulties would arise against carrying such a " provision into execution, besides which, the public " are quite able to take care of themselves in such " matters."

By petition No. 201, a considerable number of wine growers on the Moselle, the Saar, and the Rhine, pray that a " fuder " may be declared by law to be equivalent to 1,000 liter or 10 hectoliter. The committee was of opinion that this wish would indirectly be attained, as the hectoliter must become the measure commonly used, which no doubt would be the case immediately after the introduction of the Metric system. But they doubted the expediency of legalizing a special measure of this kind, in addition to the legal measures adopted, even one containing 1,000 liters, as such a precedent would give rise to many other requests of a similar kind. The committee accordingly resolved :

" Considering that the adoption of a special fuder " measure would be an inexpedient precedent, they " pass to the order of the day."

Petition No. 392 was considered to be disposed of by the preceding resolutions ; and No. 331 was declared to be not altogether adapted for their decision.

Petition No. 342 prayed that the ruthe of five meters, as proposed to be legalized, should be struck out. This had already been done.

Petition No. 89 had in like manner been disposed of by Art. 11.

The Committee then took into consideration petition No. 399 from the Director of the office of Woods and Forests in Neustadt-Eberswald ; a comprehensive paper written with a thorough knowledge of the subject, in which the author advocates the adoption, for all measurements of fire-wood or timber, of the schachtmeter, being a measure one meter long and broad, and one-tenth of a meter (or a decimeter) high. For superficial measures, he considers the hectare and are to be sufficient, although the morgen as proposed might be adopted. Whilst the Committee acknowledged the great merits of this paper, they were nevertheless, unable to recommend the adoption of the proposed schacht-meter. Not to mention its inconvenient form, they thought there was no necessity for this new cubic measure. It is exactly one-tenth of the cubic meter ; in numerical calculations, therefore, the column could be headed either " one-tenth cubic meter " (instead of " schacht-meter," as proposed), or, " hectoliter " would be at once the best practical substitute, as it is known to be the tenth part of a cubic meter. The circumstance of the hectoliter being generally used as a measure of capacity can be no objection, but must rather be considered as advantageous, as it would enable people, for example, to measure charcoal with the same measure as the wood from which the charcoal is made. Every one will comprehend that the hectoliter need not necessarily be always constructed in the shape of a ton, but may just as well be made in a form suitable for wood, or somewhat cubical ; for which, indeed, Art. 3 has already provided. For these reasons the Committee decided that the petition should be considered as having been disposed of.

In conclusion, the Committee had before them a petition, No. 431, which urged the adoption of a legal provision that pit coals, brown coal, and coke, should be sold not by measurement but by weight only, because the first mode of selling greatly facilitated frauds, and indeed all the Royal coal mine authorities had pronounced in favour of the sale by weight. The Committee resolved to pass to the order of the day, as they considered that it would be inexpedient to interfere arbitrarily with the public in a matter of this kind, and that the sale by weight might well be left to find its own way.

(Signed by the following Members of the Committee.)

V. Einsiedel, *Chairman.*	Al-Goeddertz.
V. Hoverbeck, *Reporter.*	Böckel.
Evelt, *Secretary.*	Bail.
Dr. Strousberg.	Neubbronner.
V. Cranach.	Sombart.
V. Thadden.	

Berlin, 6th June 1868.

There is appended to the Report a comparison in parallel columns between the Government project of law and the Bill as amended by the Committee. It may be sufficient here to state the alterations made by the Committee in the Government project.

Government Project.	*Alterations of Committee.*
ART. 3 and 4.	These articles transposed— In Art. 3 the words, "Ten metres make a dekameter," inserted, and "Land Measures," "Measures of Capacity" omitted.
ART. 5. A *Ruthe* shall mean a length of 5 metres. A *Morgen*, a superficial measure of 2,500 square metres, equal to $\frac{1}{4}$ hectar, equal to 100 square ruthen, whenever such names shall in future be used in business transactions.	Omitted.
ART. 6. The mile of 7,500 metres is to be exclusively used as a measure of distance.	Omitted.
ART. 7. The pound, equal to half the kilogramm (Art. 1) is the unit of weight. The kilogramm is the weight of a liter of distilled water at + 4° of the centigrade thermometer. The pound is divided into 500 parts, with decimal subdivisions. The 500th part of the pound is called a *Gramm.* The 100th part of the pound, = to 5 gramms, is called a *Quint.* The decimal subdivisions of the gramm are— The *Dezigramm* = $\frac{1}{10}$ gramm. The *Zentigramm* = $\frac{1}{10}$ dezigramm, or $\frac{1}{100}$ gramm. The *Milligramm* = $\frac{1}{10}$ zentigramm, or $\frac{1}{1000}$ gramm. The *Zentnar* = 100 pounds, or 50 kilogramms. The *Schiffslast* = 4,000 pounds or 2,000 kilogramms.	ART. 5. The kilogramm is the unit of weight. The kilogramm is the weight of a liter of distilled water, at + 4° of the centigrade thermometer. The kilogramm is divided into 1,000 gramms, with decimal subdivisions. 10 gramms are called a *Dekagramm.* The 10th part of a gramm is called a *Dezigramm.* The 100th part of a gramm is called a *Zentigramm.* The 1,000th part of a gramm is called a *Milligramm.* The *Tonne* is equal to 1,000 kilogramms.
ART. 9. With regard to the weight of coin, the division of the pound (Art. 7) into 1,000 parts, with further decimal subdivisions, continues as fixed by Art. 1 of the monetary convention of 24th January 1857. This mint weight shall also be legal for weighing gold, silver, jewels, and pearls.	ART. 7. The weight of coin remains in force as fixed by the provisions contained in Art. 1 of the Monetary Convention of 24th January 1857.
ART. 17. The establishment of offices of verification (Art. 16) will be regulated by the Federal Government, in accordance with the law of each locality. This office may be limited to a single branch of Standards business, or may be extended to several branches.	For "This Office," insert "These Offices."

Summary of discussion in Federal Parliament, on the Government Bill.

SUMMARY of the Conclusion of the General Discussion in the Federal Parliament, on the Government Weights and Measures Bill, on 13th June 1868. (Translated from the Supplement to the *Nord deutschen Allgemeinen Zeitung* of 16th June 1868.)

Herr Grumbrecht proposed to fix the highest standard weight at 50 kilog. (100 lbs.) instead of 20, as proposed in the Bill; and recommended in general the propositions of the Committee.

H. Sombart defended the adoption of the foreign denominations, as proposed, of the new measures, etc.

H. v. Vincke proposed some alterations which, however, afterwards were entirely rejected.

H. v. Schoning spoke in favour of an amendment of Dr. Becker for postponing the whole question, which amendment was afterwards rejected by a large majority.

H. Twesten against the amendment.—As the Metric system is being introduced in England and America, no ground existed for longer postponing the question in Germany.

Dr. Weinlig, one of the Federal Commissioners, who had been appointed to sit upon the Committee, explained the state of the question in England. In 1864 a private bill was adopted by Parliament, declaring the adoption of the Metric system permissive. In the four years since passed, this law has proved so successful that from permissive it is about to be made compulsory, by a bill which has been read a second time six weeks ago, and passed by a very large majority, and it may be expected that it will pass also at the third reading. At the late international conference on the subject all those competent persons assembled and representing so many different governments, pronounced themselves in favour of the Metrical system.

The House then entered upon a Special Discussion of the Bill.

S. 1 of the Government project was adopted with a slight amendment, to stand thus:—The meter (the *stab*) is the basis of measures and weights.

S. 2 was adopted without debate.

S. 3 of the Committee was further amended by H. Twesten and Unruh, who proposed to add German names to the Metric measures, and, after a short conversation, was adopted.

S. 4 was adopted without discussion (see s. 3 of the law, p. 25).

S. 5 of the Government project, for legalizing the *Ruthe** (or perch) or 5 meters; the *Morgen*† of 2,500 square meters, and equal to ¼ *Hektar* and 100 *Quadratruthen;* the *Klafter*‡ of 4 cubic meters, having been rejected by the Committee, it was now moved that this clause be reinstated; it was further proposed to legalize the *Lachter* or *Faden* (miner's fathom) as a measure of length of two meters. After some remarks, the clause was rejected.

S. 6 of the Government project: "The mile of "7,500 meters is to be used exclusively as the mea- "sure of distance" having been rejected by the Committee, the following amendment proposed by H. Twesten and Unruh was adopted, "The mile of 7,500 meters is to serve as a measure of distance."

S. 7 of the Government project, which had been amended by the Committee, was now further amended by H. Twesten and Unruh, with the view of retaining the pound as the half-kilogram; and the clause thus amended was adopted, after some discussion, as s. 6 of the Law.

SS. 6 to 12 of the Committee, being identical with the Government project, were adopted without discussion, as ss. 7 to 13 of the Law.

S. 13, after rejection of two amendments, was adopted as it now stands (s. 14).

SS. 14 to 19 of the Committee, being identical with the Government project, were adopted without discussion.

The last clauses of the bill, ss. 20, 21, and 22, were in like manner adopted without discussion; as were also the following proposals of the Committee:—

To invite the President of the Confederation,

1. To submit as soon as possible to the Reichsrath a new and strictly decimal monetary system with a special view to its offering the greatest possible inducements (guarantees) towards its extension to a general system for all civilized nations.

2. To endeavour to effect, through negotiations with those states which have adopted, or may hereafter adopt, the Metric system of weights and measures, that deviations from the commonly established system should only be determined upon by a conference of all states interested.

Law of June 13, 1868, *in the original German.*

No. 150.

REICHSTAG DES NORD-DEUTSCHEN BUNDES.

1. Legislatur-Periode, Sitzungs-Periode 1868.

Maas-und Gewichts-Ordnung für den Norddeutschen Bund.

(Nach den Beschlüssen des Reichstages.)

WIR WILHELM von Gottes Gnaden König von Preussen &c. verordnen in Namen des Norddeutschen Bundes, nach erfolgter Zustimmung des Bundesraths und des Reichstages, was folgt:—

Artikel 1.—Die Grundlage des Maasses und Gewichtes ist das Meter oder der Stab, mit dezimaler Theilung und Vervielfachung.

Artikel 2.—Als Urmaass gilt derjenige Platinstab, welcher im Besitze der Königlichen Preussischen Regierung sich befindet, im Jahre 1863, durch eine von dieser und der Kaiserlich Französischen Regierung bestellte Kommission mit dem in dem Kaiserlichen Archive zu Paris aufbewahrten *Mètre des Archives* verglichen, und bei der Temperatur des schmelzenden Eises gleich 1·00000301 Meter befunden worden ist.

Artikel 3.—Es gilten folgende Maasse;

A. Längenmaasse.

Die Einheit bildet das Meter oder der Stab.

Der hundertste Theil des Meters heisst Zentimeter oder Neu-Zoll.

Der tausendste Theil des Meters heisst Millimeter oder Strich.

Zehn Meter heissen ein Dekameter oder Kette.

Tausend Meter heissen ein Kilometer.

B. Flächenmaasse.

Die Einheit bildet das Quadratmeter oder Quadratstab.

Hundert Quadratmeter heissen das Ar.

Zehntausend Quadratmeter heissen das Hektar.

C. Körpermaasse.

Die Grundlage bildet das Kubikmeter.

Die Einheit ist der tausendste Theil des Kubikmeters und heisst das Liter oder die Kanne.

Das halbe Liter heisst ein Schoppen.

Hundert Liter oder der zehnte Theil des Kubikmeters heisst ein Hektoliter oder Fass.

Funfzig Liter sind ein Scheffel.

Artikel 4.—Als Entfernungsmaass dient die Meile von 7,500 Metern.

Artikel 5.—Als Urgewicht gilt das im Besitze der Königlich Preussischen Regierung befindliche Platin-Kilogramm, welches mit Nummer 1 bezeichnet, im Jahre 1860, durch eine von der Königlich Preussischen und der Kaiserlich Französischen Regierung niedergesetzte Kommission mit dem in dem Kaiserlichen Archive zu Paris ausbewahrten Kilogram prototype verglichen und gleich 0·999999842 Kilogramm befunden worden ist.

Artikel 6.—Die Einheit des Gewichts bildet das Kilogramm (gleich zwei Pfund). Es ist das Gewicht eines Liters destillirten Wassers bei + 4 Gr. des hundert-theiligen Thermometers.

Das Kilogramm wird in 1,000 Gramme getheilt, mit dezimalen Unter-Abtheilungen.

Zehn Gramme heissen ein Dekagramm oder Neuloth.

Der zehnte Theil eines Gramms heisst ein Dezi gramm, der Hundertste ein Zentigramm, der tausendste ein Milligramm.

Ein halbes Kilogramm heisst ein Pfund.

50 Kilogramm oder 100 Pfund heissen ein Zentner

1000 Kilogramm oder 2000 Pfund heissen eine Tonne.

Artikel 7.—Ein von diesem Gewichte (Artikel 6) abweichendes Medizinalgewicht findet nicht statt.

Artikel 8.—In Betreff des Münzgewichts verbleibt es bei der im Artikel 1, des Münzvertrages vom 24 Januar 1857 gegebenen Bestimmungen.

Artikel 9.—Nach beglaubigten Kopieen des Urmaasses (Artikel 2) und des Urgewichts (Artikel 5) werden die Normalmaasse und Normalgewichte hergestellt und richtig erhalten.

Artikel 10.—Zum Zumessen und Zuwägen im öffentlichen Verkehre dürfen nur in Gemässheit dieser Maass-und Gewichts-Ordnung gehörig gestempelte Maasse, Gewichte und Waagen angewendet werden.

Der Gebrauch unrichtiger Maasse, Gewichte und Waagen ist untersagt, auch wenn dieselben im übrigen den Bestimmungen dieser Maass-und Gewichts-Ordnung entsprechen. Die näheren Bestimmungen über de aussersten grenzen der im öffentlichen Verkehr noch zu duldenden Abweichungen von der absoluten Richtigkeit erfolgen nach Vernehmung der im Artikel 18 bezeichneten technischen Behörde durch den Bundesrath.

Artikel 11.—Bei dem Verkaufe weingeistiger Flüssigkeiten nach Stärkegraden dürfen zur Ermittelung des Alkoholgehaltes nur gehörig gestempelte Alkoholometer und Thermometer angewendet werden.

Artikel 12.—Der im Fässern zum Verkauf kommende Wein darf dem Käufer nur in solchen Fässern,

* The length of the *Ruthe* varies in different localities from the old Leipsic *Ruthe* of 4·946 English yards, to the legal Prussian *Ruthe* of 4·119 yards.

† The old superficial measure of the *Morgen* at Aix-la-Chapelle, was 0·744 English acre; the legal Morgen at Berlin since 1816 was equal to 0·631 acre.

‡ The *Klafter* (or fathom), as a measure of length, is equal to about two English yards; as a cubic measure, or measure of firewood, at Berlin, it is a pile, a klafter in height and length, of logs of wood, each half klafter long, and is therefore equal to about 108 cubic feet.

auf welchen die den Raumgehalt bildende Zahl der Liter durch Stempelung beglaubigt ist, überliefert werden.

Eine Ausnahme hiervon findet nur bezüglich desjenigen ausländischen Weines statt, welcher in den Originalgebinden weiter verkauft wird.

Artikel 13.—Gasmesser, nach welchen die Vergütung für den Verbrauch von Leuchtgas bestimmt wird, sollen gehörig gestempelt sein.

Artikel 14.—Zur Eichung und Stempelung sind nur diejenigen Maasse und Gewichte zuzulassen, welche den in Artikel 3 und 6 dieser Maas- und Gewichts-Ordnung benannten Grössen, oder ihrer Hälfte, sowie ihrem Zwei-, Funf-, Zehn-, und Zwanzigfachen entprechen. Zulässig ist ferner die Eichung und Stempelung des Viertel-Hektoliter, so wie fortgesetzgter Halbirungen des Liter.

Artikel 15.—Das Geschäft der Eichung und Stempelung wird ausschliesslich durch Eichungsämter ausgeübt, deren Personal von der Obrigkeit bestellt wird. Diese Amter werden mit den erforderlichen, nach dem Normalmaassen und Gewichten (Artikel 9) hergestellten Eichungsnormalen, beziehungsweise mit den erforderlichen Normal-Apparaten versehen. Die für die Eichung und Stempelung zu erhebenden Gebühren werden durch eine allgemeine Taxe geregelt (Artikel 18).

Artikel 16—Die Errichtung der Eichungsämter (Artikel 15) steht den Bundes-Regierungen zu und erfolgt nach den Landesgesetzen. Dieselbe können auf einen einzelnen Zweig des Eichungsgeschäfts beschränkt sein, oder mehrere Zweige desselben umfassen.

Artikel 17.—Die Bundes-Regierungen haben, jede für sich oder mehrere, gemeinschaftlich, zum Zweck der Aussicht über die Geschäftsführung und die ordnungsmässige Unterhaltung der Eichungsämter die erforderlichen Anordnungen zu treffen. In gleicher Weise liegt ihnen die Fürsorge für eine periodisch wiederkehrende Vergleichung der im Gebrauche der Eichungsämter besindlichen Eichungsnormale (Artikel 15) mit den Normalmaassen und Gewichten ob.

Artikel 18.—Es wird eine Normal-Eichungs-Kommission vom Bunde bestellt und unterhalten. Dieselbe hat ihren Sitz in Berlin. Die Normal-Eichungs-Kommission hat darüber zu wachen, dass im gesammten Bundesgebiete das Eichungswesen nach übereinstimmenden Regeln und dem interesse des Verkehrs entsprechend gehandhabt werde. Ihr liegt die Anfertigung und Verabfolgung der Normale (Artikel 9) so weit nöthig auch der Eichungsnormale (Artikel 15) an die Eichungstellen des Bundes ob, und ist sie daher mit den für ihren Geschäftsbetrieb nöthigen Instrumenten und Apparaten auszurüsten.

Die Normal-Eichungs-Kommission hat die nähern Vorschriften über Material, Gestalt, Bezeichnung und sonstige Beschaffenheit der Maasse und Gewichte ferner über die von Seiten der Eichungsstellen innezuhaltenden Fehlergrenzen zu erlassen. Sie bestimmt, welche arten von Waagen im öffentlichen Verkehr oder nur zu besonderen gewerblichen Zwecken angewendet werden dürfen und setzt die Bedingungen ihrer Stempelfähigkeit fest. Sie hat ferner das Erforderliche uber die Einrichtung der sonst in dieser Maass-und Gewichts-Ordnung aufgestellten Messwerkzeuge vorzuschreiben, so wie über die Zulassung anderweiter Geräthschaften zur Eichung und Stempelung zu entscheiden. Der Normal-Eichungs-Kommission liegt es ob, das bei der Eichung und Stempelung zu entscheiden. Der Normal-Eichungs-Kommission liegt es ob, das bei der Eichung und Stempelung zu beo bachtende Verfahren und die Taxen für die von den Eichungsstellen zu erhebenden Gebühren (Artikel 15) festzusetzen und überhaupt alle die technische Seite des Eichungswesens betreffenden Gegenstände zu regeln.

Artikel 19.—Sämmliche Eichungsstellen des Bundesgebiets haben sich, neben dem jeder Stelle eigenthümlichen Zeichen, eines übereinstimmenden Stempelszeichens zur Beglaubigung der von ihnen gerichten Gegenstände zu bedienen.

Diese Stempelzeichen werden von der Normal-Eichungs-Kommission bestimmt.

Artikel 20.—Maasse, Gewichte und Messwerkzeuge, welche von einer Eichungstelle des Bundesgebietes gericht und mit dem vorschriftssmässigen Stempelzeichen beglaubigt sind, dürfen im Ganzen Umfange des Bundesgebiets im öffentlichen Verkehr angewendet werden.

Artikel 21.—Diese Maass- und Gewichts-Ordnung tritt mit dem 1 Januar 1872 in Kraft.

Die Landen-Regierungen haben der Verhältnisszahlen für die Umrechnung der bisherigen Landesmaasse und Gewichte in die neuen festzustellen und bekannt zu machen, und sonst alle Anordnungen zu treffen, welche, ausser den nach Artikel 18 der technischen Bundes-Central-Behörde vorbehaltenen Vorschriften zu Sicherung der Ein- und Durchführung der in dieser Maass-und Gewichts-Ordnung, namentlich in Artikel 10, 11, 12, und 13 enthaltenen Bestimmungen erforderlich sind.

Artikel 22.—Die Anwendung der dieser Maass- und Gewichts-Ordnung entsprechenden Maasse und Gewichte ist bereits vom 1 Januar 1870 an gestattet insofern die Betheiligten hierüber einig sind.

Artikel 23.—Die Normal-Eichungs-Kommission (Artikel 18) trit alsbald nach Verkündung des Maass- und Gewichts-Ordnung in Thätigkeit, um die Eichungs-Behörden bis zu dem im Artikel 22 angegebenen Zeitpunkt zur Eichung und Stempelung der ihnen vorgelegten Maasse und Gewichte in den Stand zu setzen.

Urkundlich, &c.
Gegeben, &c.
Berlin, den 13 Juni 1868.

XI. Kommission.

v. Einsiedel, (Vorsitzender). *v.* Hoverbeck. (Berichterstatter).

This Law translated into English.

This law translated intoEnglish

Law of 13th June 1868, for the regulation of weights and measures for the North German Confederation, as determined by the Federal Parliament.

We, William, by the grace of God, King of Prussia, &c., in the name of the North German Confederation, and with the consent of the Federal Council and Parliament, order as follows :—

Section 1. The basis of measure and weight is the *Meter*, or *Stab**, with decimal parts and multiples.

Section 2.—The primary standard measure of length is the platinum bar in possession of the Prussian Government, which, in the year 1863, was found by a commission appointed by the French and Prussian Governments to be equal to 1·00000301 metre, at the temperature of melting ice, by comparison with the Mètre des Archives, deposited at the Imperial Palais des Archives at Paris.

Section 3. The following are declared to be the legal measures :

Measures of length :

The *Meter*, or *Stab* is the unit.

Centimeter, or *New-Zoll* †	=	0·01 meter.
Millimeter, or *Strich*‡	=	0·001 „
Dekameter, or *Kette* (chain)	=	10· meters.
Kilometer	=	1000· „

Superficial Measure :

The Square meter, or *Quadrat-Stab*, is the unit.
The *Ar* = 100 square meters.
The *Hektar* = 1000 „

Measures of capacity :

The cubic meter is the basis.
The *Liter*, or *Kanne*, § is the unit, = $\frac{1}{1000}$th part of the cubic meter.
A *Schoppen*‖ = the half liter.

* The *Stab* (rod or ell) is a measure of length in Germany varying in different localities from 1·16975 English yards at Friburg, to 1·31236 yards at Frankfort.

† The zoll (or inch) corresponds nearly with the English inch.

‡ The *Strich* or (line), = 0·0858 inch.

§ The *Kanne* (pot or can) is an old German measure of capacity, the *beer-kanne*, varying from 0·247 gallon at Dresden to 0·518 gallon at Hanover. The Liter is equal to 0·22 English gallon.

‖ The *Schoppen* (Scotch, *chopin*) is used throughout Germany, principally as a beer measure; it is nearly = 0·1 English gallon.

The *Hektoliter*, or *Fass*,*	= 100 liters, or $\frac{1}{10}$ of the cubic meter.
A *Scheffel*†	= 50 liters.

Section 4. The mile‡ of 7,500 meters is the measure of distance.

Section 5. The primary standard weight is the Platinum kilogramm (marked No. 1), now in possession of the Prussian Government and found in the year 1860, by the Commission appointed by the Prussian and French Governments, on comparison with the "kilogramme prototype" deposited in the Imperial Archives at Paris, to be equal to 0·999999842 kilogramm.

Section 6. The *Kilogramm* is the unit of weight = 2 pounds. It is the weight of a *liter* of distilled water at 4° of the centigrade thermometer.

The kilogram is divided into 1000 grams, with decimal subdivisions.

A *Dekagramm* or *New Loth*§	= 10 grams.
A Dezigramm - - -	= 0·1 gram.
A Zentigramm - - -	= 0·01 „
A Milligramm - - -	= 0·001 „
A *Pfund*‖ - - -	= a half kilogram.
A *Zentner*¶ - - -	= 50 kilograms, or 100 pounds.
A *Tonne* - - -	= 1000 kilograms, or 2000 pounds.

Section 7. No Medicinal weight differing from the weights in Section 6 is legal.

Section 8. The weight of coin continues as fixed by the provisions of Article 1 of the Monetary Convention of 24th January 1857.

Section 9. The official legal standard measures and weights are to be established and adjusted in relation to verified copies of the primary standard measure of length (Section 2), and the primary standard weight (Section 5).

Section 10. No measures, weights, or scales, except such as are duly stamped in conformity with this law, are allowed to be used for measuring and weighing in public traffic.

The use of unjust measures, weights, and balances is prohibited even if they correspond in other respects with the provisions of this law. Minute regulations for the utmost limits of deviation from absolute accuracy will be laid down, after due inquiry, by the Commission to be appointed by the Federal Council, at described in Section 18.

Section 11. None but duly stamped alcohol-meters and thermometers shall be used for ascertaining the amount of alcohol contained in spirituous liquors sold according to their strength.

Section 12. Wine brought for sale in casks is allowed to be delivered to a purchaser, only in such casks as have the number of liters which they hold duly attested by a stamp upon them.

Special exception is made with respect to those foreign wines which are resold in the original casks.

Section 13. Gas meters, by means of which the charge for the quantity of gas consumed is calculated, must be duly stamped.

Section 14. Those measures and weights only are allowed to be compared and stamped which correspond with the whole, the half, or the 2nd, 5th, 10th, and 20th multiples of the measures and weights mentioned in Sections 3 and 6 of this law. The quarter hektoliter, as well as successive binary subdivisions of the liter, are also allowed to be compared and stamped.

Section 15. The work of comparing and stamping will be performed exclusively by standards officers, who will be appointed by the magistracy. These officers will be furnished with the requisite legal standard weights and measures duly verified in relation to the established primary standards (Section 9), as well as with such standards apparatus as they may require. The charges to be made for comparing and stamping will be regulated by a general tariff (Section 18).

Section 16. The establishment of offices of verification (Section 15) will be regulated by the Federal Government, in accordance with the law of each locality. The work of these offices may be limited to a single branch of standards business, or may be extended to more branches.

Section 17. The Federal Government will draw up the requisite orders, either separately or generally, for regulating the conduct of the standards business and securing the due observance of the established regulations in the several offices. In like manner they will provide for the periodically recurring comparison and verification with the primary standards of the legal standard weights and measures (Section 15) used by the officers.

Section 18. A Standards Commission for the legal verification of weights and measures shall be appointed and maintained by the Confederation. They will hold their sittings at Berlin.

It will be the duty of the Commission to watch that the standards business throughout the whole of the Federal territory is performed according to uniform regulations and in conformity with the interests of the trading community. It rests with them to direct the construction of the several legal standards (Sections 9), their due comparison with the primary standards (Section 15), and their delivery at the several standards offices of the Confederation, as well as to provide the different instruments and apparatus required for the due execution of the business.

The Standards Commission shall issue detailed instructions for the material, form, description, &c. of weights and measures, as well as for the limits of error to be tolerated by the standard offices. They will determine what kinds of balances may be employed either for general traffic or for the special purposes of particular trades, and to fix the conditions required for obtaining the official stamp. They will also have to provide whatever instruments may be requisite for accurate comparisons with the standard weights and measures directed by this law, as well as to determine the various modes of comparison and stamping. And they will have to establish an effective supervision over the work of comparing and stamping, to fix the charges to be levied for the work done at the standards offices, and generally to regulate all special matters relating to the technical business of standards.

Section 19. Every local standards office throughout the Federal territory will have to be furnished with a common stamp to be affixed as a mark of verification upon all instruments compared by the officers, in addition to a district stamp for each local office. These stamps will be determined upon by the standards commission.

Section 20. All measures, weights, and weighing apparatus which have been compared at any standards office in the Federal territory and verified by the proper stamp according to the regulations may be used for public traffic throughout the whole Federal territory.

Section 21. This law for the regulation of weights and measures shall come into force on 1st January 1872.

The local authorities will have to draw up and promulgate new tables of calculations in lieu of those now applicable to the local weights and measures, and also to establish all such regulations, with the exception of

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* The *Fass* (or cask) as a liquid measure in Germany, varies from 38·255 English gallons, the beer cask at Lubec, to 100·173 gallons, the wine cask at Leipsic.

† The *Scheffel* (or bushel) is a dry measure in Germany, varying considerably according to the locality and the commodity measured. The old Scheffel at Munster is = 0·66 English bushel, the legal Scheffel in Prussia 1·56 bushel; and the Scheffel for oats at Brunswick 10·4 bushels.

‡ The German mile = 4·68 English miles, being the average distance travelled by post in an hour. 7,500 metres are equal to 8,202¼ yards or 4·66 miles.

§ The *Loth* (or plummet) is a German weight equal to about half an English ounce avoirdupois. The dekagram is equal to 0·353 oz.

‖ The German *Pfund* or pound, varied in the several localities, being somewhat heavier than the pound avoirdupois. There was also an apothecaries pound, corresponding with our troy pound. The legal *Pfund* of Prussia was equal to 1·03118 pounds avoirdupois, previously to the establishment of the new *Zoll Pfund*, as a legal commercial weight by the law of 17th May 1856, made equal to half a kilogram, or 1·1025 lbs. avoirdupois.

¶ The *Centner* (or hundredweight) of the Zollverein was equal to 110·236 lbs. avoirdupois; the centner of Prussia to 113·44 lbs. The old centner of Bohemia, still used at Prague, is equal to 136·08 lbs. avoirdupois.

the more technical directions reserved by Section 18 to be given under the authority of the Central Federal Government, as may be necessary for securing the introduction and carrying out of this weights and measures law, especially the enactments contained in Sections 10, 11, 12, and 13.

Section 22. The use of weights and measures in conformity with this law is authorized to begin from 1st January 1870, if the parties concerned agree.

Section 23. The Standards commission (Section 18) will enter upon their duties immediately after the promulgation of this weights and measures law, so that the standards officers may be enable to undertake the comparision and stamping of the new weights and measures by the time specified in Section 22.

Formally attested, &c.

Berlin, 13th June 1868. XI. Commission,
v. Einsiedel,
President.
v. Hoverbeck,
Secretary.

Other proceedings in Germany for introducing the Metric system.

Before concluding the portion of this paper relating to German weights and measures, there are one or two other publications now in the Standard Departments and containing information connected with the subject, which may be noticed.

Proposals of Hanoverian Society of Architects and Engineers, in 1860.

In 1860, under the direction of the Hanoverian Government, a project for a uniform system of weights and measures in Germany was drawn up by the Society of Architects and Engineers in Hanover.* They came to the conclusion that the French Metric system was the only scientific system, and should be introduced throughout Germany. They appended a table of the relation of the metre to the German measures of length in the several States of the Federation, as well as of the litre to the several measures of capacity. In order to show the existing diversity of these measures in Germany, it may be sufficient here to show the relations between the metre and the German foot :—

Names of States.	French metre=	German foot=
	German feet.	Metre.
Baden	$3\frac{1}{3}$	0·30000
Bavaria	3·42631	0·29186
Brunswick	3·50432	0·28536
Bremen	3·45602	0·28935
Frankfort	3·51358	0·28461
Hamburg	3·48953	0·28657
Hanover	3·42355	0·29209
Hesse, Ducal	4·00000	0·25000
Hesse, Electoral	3·47585	0·28770
Lubeck	3·47683	0·28760
Mecklenburg	3·48643	0·29100
Nassau	$3\frac{1}{3}$	0·30000
Austria	3·16345	0·31611
Oldenburg	0·37975	0·29588
Prussia	3·18620	0·31385
Saxony	3·53120	0·28319
Wurtemburg	3·49052	0·28649
Switzerland	$3\frac{1}{3}$	0·30000

Dr. Hültze's paper laid before the Frankfort Commission.

The report adopted by the Frankfort Commission in 1861 was drawn up by Dr. Karmarsch, the member from Hanover, who in the following year appeared as a witness in favour of the Metric system before the Select Committee of the House of Commons. An elaborate paper† upon the subject was also laid before the Commission by Dr. Hültze, the member from Saxony, in which he proposed various regulations for carrying out a new German system, based on the French metre.

Resolution of Congress of German Architects and Engineers at Frankfort in 1861.

In September 1860, there met also at Frankfort a congress of architects and engineers chosen from the several States of the Confederation, who printed and published an account of their proceedings.‡ Amongst other matters, they deliberated upon the weights and measures of Germany, and passed a resolution practically to support the proposal of the Hanoverian Society for adopting the Metric system throughout Germany.

Accurate and scientific construction Prussian units of weights measures.

Although it has been shown there is considerable diversity among the standard units of weights and measures in the different States of the North German Confederation, attention may be drawn to the exceedingly accurate and scientific construction of the Prussian units, already alluded to in M. Brix's Report of 28th September 1861.

Previously to 1816 the standard unit of length in Prussia was the Rhenish foot, legalised in 1771. Its length varied in different localities, but was about equal to 139·13 Paris lines, or lines of the Toise of Peru. This is equivalent to 0·34324 English yard, or 1·02972 foot.

By the law of 16th May 1816, the foot of this length was thenceforward constituted the Prussian foot. This law directed that a standard measure of this foot should be deposited in the office of the Minister of Finance and Trade, together with the other weights and measures to be derived from it, and it was declared to be the only authoritative primary standard of weights and measures in Prussia. Three sets of copies of the original standards were ordered to be constructed, one to be deposited in the office of the Commissioners of Public Buildings, a second at the Academy of Sciences, and a third at the Berlin Chamber of Justice. These were to be compared with the originals every 10 years.

The pound or the unit of weight was to be derived from the foot, being $\frac{1}{6}\frac{1}{6}$th part of the weight in a vacuum of a cubic feet of distilled water at the temperature of 15° Reaumur. This standard temperature differed from that of the Paris foot, upon the length of which the Prussian foot was based, as well as of the Toise of Peru.

The standard foot and three copies were constructed by Pistor. They consisted of iron bars 3 feet 4 inches (Zoll = $\frac{1}{12}$ foot) long, 14·6 lines broad, and 4·9 lines deep (Line = $\frac{1}{12}$ Zoll). Three feet are marked on each bar, and are divided into inches, the last inch into 12 lines. Short fine strokes between two lines drawn along the length of the bar, 0·4 line from each other, denote the several measures. They are marked upon silver pins which pass through the iron bar, except for the last subdivided inch, which is marked upon a silver plate.

In 1839 a new standard measure of length was constructed under Bessel's directions, and which is described by the Astronomer Royal in his report upon the construction of the new standard yard (§ 70) as "the most celebrated of the standards constructed in "modern times." This was an end standard which Bessel preferred to a line standard from its greater durability and facility of accurate measurement. Its standard temperature was the same as that of the Toise of Peru, 13° Reaumur, or 16·25 centigrade. This new Prussian standard is of a bar cast steel about half a line shorter than 3 feet, and 9 lines square in its section. Truncated cones of sapphire, with the smaller ends outwards, having been let into the bar, the extremities thus constitute an end measure of 3 Prussian feet. It was compared microscopically with three good copies of the toise and found equal to 417·38939 French lines, being too short by 0·00061 French lines, or 0·00063 Prussian lines. It bears an inscription in German to the following effect :—

See also Appendix to Standard Report, p. 31.

"Standard of the Prussian unit of length, 1837.
"This bar at 16°·25 cent. when measured along its
"axis, is 0·00063 lines shorter than 3 feet."

By the Prussian law of 10th March 1839 this bar is declared, with the above-mentioned correction, to be the legal standard.

* "Einheitliches Massystem für Deutschland:" Hanover, 1860. 34 pp. 4to.
† "Referat des Dr. Hültze, über die Maasregeln zur Ausführung des vorgeschlagenen Systems." 40 pp. fol.
‡ Sitzungs-Protokolle der Deutscher Architecten und Ingenieure, zu Frankfurt am Main, 1861. 66 pp. 8vo.

* Bessel's Populäre Vorlesungun, edited by Schumacher, Hamburg, 1848, 636 pp. 8vo. Zur Frage über das Deutsche Mauss. von G. Hagen, Geh. Ober-Baurath, &c., zu Berlin. Berlin, 1861 (32 pp. 8vo.)
† The Toise of Peru is an end standard of iron, constructed in France in 1735, and used for the measurement of an arc of the meridian in Peru. On its return to France it was constituted the standard unit of length, at 13° Reaumur, being divided into 6 feet, each foot into 12 inches, and each inch into 12 lines. This Toise was equivalent to 2·13151 English yard. Bessel's Populäre Vorlesungen, p. 276.

Several copies of this standard were also constructed and verified by Bessel, and found to agree within 0·0001 line, or, as he states, within the three-hundredth part of the breadth of a human hair. Upon his comparing the four standards made in 1816 with this new standard they were found to agree within the limits of probable errors of observation. (Ich keinen mit Sicherkeit angeblicken Unterschied habe finden können.)

The Prussian unit of weight, according to the law of 1816, being the pound equal to the 66th part of the weight of a cubic foot of distilled water, was also equal to two Cologne marks; the mark of Cologne having been the standard weight for precious metals throughout Germany since the publication of an edict of the Emperor Charles V. in 1524. Its equivalent in English weight is 7,218 grains, or 1·03118 lb. avoirdupois.

Introduction of the Metric System into the United States of North America.

The following information relating to the introduction of the Metric system into the United States of North America is taken partly from a report upon the subject by Mr. H. Yates Thompson, appended to the "Report of the Committee of the British Association "on Uniformity of Weights and Measures," Nottingham, August 1866 (the late Lord Wrottesley having been a member of this committee); and partly from a small book on the Metric system published at Philadelphia in 1867, containing extracts from the proceedings in Congress relating to its introduction.

It would appear that ever since the settlement of the constitution of the United States in 1789, in which it was declared that Congress have power "to fix the standard of weights and measures," efforts have been made to establish a uniform and decimal system. In 1790, in accordance with a recommendation of President Washington, Mr. Jefferson, then Secretary of State, reported elaborately on the subject of uniformity of weights and measures, and recommended the seconds pendulum as the standard of measure. In 1817 the matter was referred by the Senate to Mr. John Quincy Adams, who accordingly reported in 1821, and in his celebrated essay advised *a suspension of all innovation at home until an international scheme could be adopted in America in conjunction with foreign nations.*

But no practical step was taken for this object until after the International Postal and Statistical Congresses held at Paris and Berlin respectively in 1863, when the representatives from the United States gave their concurrence to the resolutions passed at both meetings in favour of the general adoption of the Metric system. In December 1863 Mr. Ruggles, the representative at Berlin, forwarded to the Secretary of State a report upon the subject, which was printed and published officially.

In the mean time the National Academy of Sciences had been incorporated in 1863 by the Senate and House of Representatives of the United States, and consisted of a body of not more than 50 scientific men, whose chief duty is, whenever called upon by any department of the Government, to "investigate, ex-"amine, experiment, and report upon any subject of "science or art." In the same year, at the instance of Mr. Chase, the Secretary of the Treasury, the Academy appointed a committee on weights, measures, and coinage, which included the most distinguished men of science in America, who had given special attention to the subject of weights and measures.

From 1863 to 1865 the civil war raged in America. But in 1866 the committee made their report, recommending that Congress should authorize and encourage the introduction and use of the Metric system, and with this object made three practical suggestions:

1. The immediate manufacture and distribution to the custom houses and States of Metric standards of weights and measures.

2. The introduction of the Metric system into the post-offices, by fixing the maximum weight of a single letter at 15 grams, instead of half an ounce, or 14·17 grams.

3. To cause the new cent and 2 cent pieces to be coined of the weight of 5 and 10 grams respectively, and that their diameters be made to bear a determinate and simple ratio to the metric unit of weight.

Referred to Committee of Congress.

This report was at once referred to a Standing Committee of the House of Representatives on Weights, Measures, and Coins, which had been constituted by Congress at the beginning of the session. They were instructed to investigate the Metric system, and to frame a suitable Bill for its adoption by law.

Extracts from their Report.

The following are extracts from the report of this committee:—

"Your committee unanimously recommended the passage of the bills and joint resolutions appended to this report. They were not prepared to go at this time beyond this stage of progress in the proposed reform. The Metric system is already used in some arts and trades in this country, and is especially adapted to the wants of others. Some of its measures are already manufactured at Bangor, in Maine, to meet an existing demand at home and abroad. The manufacturers of the well-known Fairbanks scales state: 'For many years we have had a large export demand 'for our scales with French weights, and the demand 'and sale is constantly increasing.' Its minute and exact divisions specially adapt it to the use of chemists, apothecaries, the finer operations of the artizan, and to all scientific objects. It has always been and is now used in the United States coast survey. Yet in some of the States, owing to the phraseology of their laws, it would be a direct violation of them to use them in the business transactions of the community. It is therefore very important to legalize its use, and give to the people, or that portion of them desiring it, the opportunity for its legal employment, while the knowledge of its characteristics will be thus diffused among men. Chambers of commerce, boards of trade, manufacturing associations, and other voluntary societies and individuals will be induced to consider and in their discretion to adopt its use. The interests of trade among a people so quick as ours to receive and adopt a useful novelty will soon acquaint practical men with its convenience. When this is attained—a period, it is hoped, not distant—a further act of Congress can fix the date for its exclusive adoption as a legal system. At an earlier period it may be safely introduced into all public offices and for government service.

"In the schedule of equivalents provided in the Bill, extreme scientific accuracy is not expressed. The reasons follow. The exact length of the meter in inches, and the weight of the kilogram in grains, can of necessity be determined only approximately. The most careful determinations of these quantities now possible are liable to minute corrections hereafter, as more numerous observations are made and better instruments are used. Instead, therefore, of aiming at an accuracy greater perhaps than is attainable, it is more expedient to consult the convenience of the people by using the simplest numbers possible in the schedule, and yet such as shall be in fact more nearly exact than can ever be demanded in the ordinary business of life. These numbers are to be used in schools, and in practical life, millions of times as multipliers and divisors, and every unnecessary additional figure is justly objectionable.

"In a popular sense of the word, however, the numbers in the schedule may be said to be exact. The length of the meter, for example, is given as 39·37 inches. The mean of the best English and the best American determinations differs from this only by about the amount by which the standard bar changes its length by a change of one degree of temperature. Such accuracy is certainly sufficient for legal purposes and for popular use.

"The second measure recommended is a joint resolution, necessarily following the adoption of the

leading bill, and provides for furnishing the standards which will thereby be required, to the several States.

"The third proposition is a bill to authorize and provide for the use of the weight of 15 grams in the post-office, in conformity with the system adopted by that department for foreign correspondence.

"The nomenclature, simple as it is in theory, and designed from its origin to be universal, can only become familiar by use. Like all strange words, these will become familiar by custom, and obtain popular abbreviations. A system which has incorporated with itself so many different series of weights, and such a nomenclature as 'scruples,' 'pennyweights,' 'avoirdupois,' and with no invariable component word, can hardly protest against a nomenclature whose leading characteristic is a short component word, with a prefix signifying number. We are already familiar with *thermometer*, *barometer*, *diameter*, *gasometer*, etc., with *telegram*, *monogram*, etc.,—words formed in the same manner.

After considering every argument for a change of nomenclature, your Committee have come to the conclusion that any attempt to conform it to that in present use would lead to confusion of weights and measures; would violate the easily learned order and simplicity of Metric denomination, and would seriously interfere with that universality of system so essential to international and commercial convenience.

"When it is remembered that of the value of our exports and imports in the year ending June 30, 1860, in all $762,000,000, the amount of near $700,000,000 was with nations and their dependencies that have now authorized, or taken the preliminary steps to authorize, the Metric system, even denominational uniformity for the use of accountants in such vast transactions assumes an important significance. In words of such universal employment each word should represent the identical thing intended, and no other, and the law of association familiarizes it."

The report is signed by J. A. Kasson, the Chairman, and four other members of the Committee.

Bills and Resolutions accompanying the Report.

A Bill to authorize the use of the Metric system of weights and measures.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the passage of this act, it shall be lawful throughout the United States of America to employ the weights and measures of the Metric system; and no contract, or dealing, or pleading in any court, shall be deemed invalid, or liable to objection, because the weights or measures expressed or referred to therein are weights or measures of the Metric system.

Sec. 2. *And be it further enacted*, That the tables in the schedule hereto annexed shall be recognized in the construction of contracts, and in all legal proceedings, as establishing, in terms of the weights and measures now in use in the United States, the equivalents of the weights and measures expressed therein in terms of the Metric system; and said tables may be lawfully used for computing, determining, and expressing in customary weights and measures the weights and measures of the Metric system.

Measures of Length.

Metric Denominations and Values.		Equivalents in Denominations in Use.
Myriameter	10,000 meters	6·2137 miles.
Kilometer	1,000 meters	0·62137 mile, or 3,280 feet and 10 inches.
Hectometer	100 metres	328 feet and one inch.
Dekameter	10 meters	393·7 inches.
Meter	1 meter	39·37 inches.
Decimeter	$\frac{1}{10}$ of a meter	3·937 inches.
Centimeter	$\frac{1}{100}$ of a meter	0·3937 inch.
Millimeter	$\frac{1}{1000}$ of a meter	0·0394 inch.

Measures of Surface.

Metric Denominations and Values.		Equivalents in Denominations in Use.
Hectare	10,000 square meters	2·471 acres.
Are	100 square meters	119·6 square yards.
Centare	1 square meter	1,550 square inches.

Measures of Capacity.

Metric Denominations and Values.			Equivalents in Denominations in Use.	
Names.	Number of Liters.	Cubic Measure.	Dry Measure.	Liquid or Wine Measure.
Kiloliter or Stere	1,000	1 cubic meter	1·308 cubic yards	264·17 gallons.
Hectoliter	100	$\frac{1}{10}$ of a cubic meter	2 bus. and 3·35 pecks	26·417 gallons.
Dekaliter	10	10 cubic decimeters	9·08 quarts	2·6417 gallons.
Liter	1	1 cubic decimeter	0·908 quart	1·0567 quarts.
Deciliter	$\frac{1}{10}$	$\frac{1}{10}$ of a cubic decimeter	6·1022 cubic inches	0·845 gill.
Centiliter	$\frac{1}{100}$	10 cubic centimeters	0·6102 cubic inches	0·338 fluid oz.
Milliliter	$\frac{1}{1000}$	1 cubic centimeter	0·061 cubic inches	0·27 fluid drm.

Weights.

Metric Denominations and Values.			Equivalents in Denominations in Use.
Names.	Number of Grams.	Weight of what Quantity of Water at maximum Density.	Avordupois Weight.
Millier or tonneau	1,000,000	1 cubic meter	2204·6 pounds.
Quintal	100,000	1 hectoliter	220·46 pounds.
Myriagram	10,000	10 liters	22·046 pounds.
Kilogram or kilo	1,000	1 liter	2·2046 pounds.
Hectogram	100	1 deciliter	3·5274 ounces.
Dekagram	10	10 cubic centimeters	0·3527 ounce.
Gram	1	1 cubic centimeter	15·432 grains.
Decigram	$\frac{1}{10}$	$\frac{1}{10}$ of a cubic centimeter	1·5432 grains.
Centigram	$\frac{1}{100}$	10 cubic millimeters	0·1543 grain.
Milligram	$\frac{1}{1000}$	1 cubic millimeter	0·0154 grain.

JOINT RESOLUTION to enable the Secretary of the Treasury to furnish to each State one set of the Standard Weights and Measures of the Metric System.

Be it resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Treasury be, and he is hereby authorized and directed to furnish to each State, to be delivered to the governor thereof, one set of the standard weights and measures of the Metric system, for the use of the States respectively.

A BILL to authorize the Use in Post Offices of Weights of the Denomination of Grams.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Postmaster-General be, and he is hereby authorized and directed to furnish to the post-offices exchanging mails with foreign countries, and to such other offices as he shall think expedient, postal balances denominated in grams of the Metric system, and until otherwise provided by law, one-half ounce avoirdupois shall be deemed and taken for postal purposes as the equivalent of 15 grams of the Metric weights, and so adopted in progression; and the rates of postage shall be applied accordingly.

[The draft of a further resolution was appended, authorizing the appointment of a special commissioner to facilitate the adoption of a uniform coinage between the United States and foreign countries.]

These bills and resolutions passed the House of Representatives with little or no opposition. On being carried to the Senate, they were referred to a committee, of which the Hon. Charles Sumner was chairman. On 16th July, 1866, the committee reported favourably on the Bills and resolutions, all without amendment, and the two Bills passed into law. The Act "to authorize the Use of the Metric "System of Weights and Measures," being cap. 301 of the 39th Congress, passed on 28th July 1866, and may be found in the United States' Statutes at Large, p. 339. A copy of the Act has been compared by me with the Bill as introduced and here recited, and found to agree word for word. Congress also ordered the issue of a 5 cent coin, of an alloy of nickel and copper, having the exact weight of 5 grams, and diameter of 2 centimeters, so that five of these coins should give the length of a decimetre.

This statement of the introduction of the Metric system into the United States may be concluded by the following extract from a letter to Mr. Ruggles, the Vice-President of the United States Commission, at the Paris Exhibition, 1867, by the Hon. John Sherman, chairman of the Finance Committee of the Senate, dated 18th May 1867, and taken from Mr. Ruggles' published Report,* p. 20 :—

"I heartily sympathize with you and others in your efforts to secure the adoption of the Metric system of weights and measures.

"The tendency of the age is to break down all needless restrictions upon social and commercial intercourse. Nations are now as much akin to each other as provinces were of old. Prejudices disappear by contact. People of different nations learn to respect each other as they find that their differences are the effect of social and local custom not founded upon good reasons. I trust that the Industrial Commission will enable the world to compute the value of all productions by the same standard, to measure by the same yard or metre, and weigh by the same scales.

"Such a result would be of greater value than the usual employments of diplomatists and statesmen."

* Report to the Department of State by S. B. Ruggles, Delegate from the United States in the International Monetary Conference at Paris, 1867. (20 pp. 4to.)

III.—QUESTION of INTRODUCING the METRIC SYSTEM into the UNITED KINGDOM, as an International or a National System of Weights and Measures.

Progress of public opinion on international communication.

Before coming to the actual consideration of this question, it may be desirable to lay before the Commission some further information, in addition to that already adduced, as to the progress of public opinion both in this country and in other countries, with regard to the general principle of giving increased facilities for international communication in all matters relating to trade and commerce as well as to science, and with this view to the adoption of an international system of weights and measures as well as of coinage.

First efforts in 1789 to establish international system of weights and measures.

In the proceedings which were commenced in France in 1789, and resulted in the establishment of the Metric system, an attempt was made by the French Government to render the question of uniformity of weights and measures an international one, and the co-operation of the British Legislature with the National Assembly was proposed by them, but met with no response in this country in consequence of the political excitement at that period.

Some years later, on the completion of the triangulation and measurement of the bases for determining the new unit of measure, another attempt was made by the French Government to render the results of their labours serviceable for international purposes. Invitations were given to all the neutral and allied countries of Europe to send representatives to a congress of scientific men that they might assist in the final settlement of a metrical system adapted to the usage of all nations.

and in 1798, resulting in introduction of French Metric system.

This first international congress for uniformity of weights and measures met at Paris in 1798, and the result was the establishment of the French Metric system. The number and the names of the scientific persons who composed the congress are stated at p. 585, vol. 3, of the *Base du Système Métrique*.

14 French members, all *Membres de l'Institut*.
2 from Spain.
2 from the Dutch Republic.
2 from the Italian Republic.
1 from Piedmont.
1 from Sardinia.
1 from Tuscany.
1 from Switzerland.
1 from the Ligurian Republic.
1 from Denmark.

Total 26 Members.

Progress of international communication up to Great Exhibition, 1851.

On account chiefly of the political disturbances in Europe, many years elapsed before any further progress was made towards introducing uniform international weights and measures; although during the long continuance of peace after the close of the French war, many circumstances contributed greatly to the promotion and encouragement of international communication. Amongst these may be specified the various improvements in the steam engine and its adaptation to steam vessels and afterwards to railways, the diffusion of general information through the press, the establishment of the principle of free trade, the increased facilities afforded by means of the post offices, and afterwards by the electric telegraph. A still greater impetus was given by the Great Exhibition of 1851, and the success in bringing together so many enlightened and scientific persons of the different nations of the world, with the vast variety of products and manufactures of the several countries.

The progressive growth of international feeling has indeed produced a new word to express this principle of mutual action for mutual interests, which the French now call *solidarité des peuples*, the word solidarity having also been accepted by us. Further evidences of its progress may be seen in the facts of the International Congress of Paris in 1855 having taken steps with the view of preventing war from breaking out in

Europe, which have since proved successful in more than one instance; and of the proposal of an international congress for mitigating the severities of war in the event of its occurrence. In 1790 the hostile feeling between England and France prevented any co-operation in the original establishment of the Metric system; in 1868, when there were indications of war being imminent between Prussia and France, the French Metric system was established in the North German Confederation.

International Association at Paris in 1856 constituted.

But the first important practical step for establishing an international system of weights, measures, and coins, was taken at the Great Exhibition in Paris in 1855, when the commissioners and juries of the several nations, after having signed a declaration, the purport of which was to promote the adoption of a uniform system of weights, measures, and coins in all civilized states of both hemispheres, constituted an International Association, of which M. James de Rothschild was elected president. Many vice-presidents were chosen from the principal countries represented at the Paris Exhibition, and arrangements were made for appointing branch societies in the several countries.

Russia was the only great state not represented at the association, from the fact of her being then at war with both France and England. But after the conclusion of peace an invitation to the Russian Academy of Science to co-operate with the association was very favourably received, and, as has been already stated, M. Kupffer was specially appointed by the Russian Government as their delegate to the fourth meeting of the association in the year 1860 at Bradford in Yorkshire.

Publications of the International Association.

Reference may here be made to the several printed publications emanating from the International Association, which have tended materially to promote the objects for which it was formed, as well as to record the efforts made by the Association, and their progress. Some of the information upon the subject contained in this paper has been derived from these publications. The following is a list of such as I have been able to procure, and which will be placed upon the table of the Commission for their inspection :—

1.–10. Ten annual reports of the meetings of the British branch of the International Association, from 1856 to 1868. (Total 273 pp. 8vo.)

11. Report of the Fourth general meeting of the International Association at Bradford in Yorkshire, in October 1859. London, 1860. (58 pp. 8vo.)

12. M. Kupffer's report, as Russian delegate to the meeting. St. Petersburg, 1860. (32 pp. 4to.)

13. Report of the committee of the British association on uniformity of weights and measures. Nottingham, August 1866. (39 pp. 8vo.)

14. Paris Exhibition, 1867. Minutes of preliminary conference in May 1866 for establishing an international system of weights, measures, and coins. (7 pp. 4to.)

15. Ministerial decree, 7th June 1866, appointing special committee for weights, measures, and coins. (3 pp. 4to.)

16. Rapport du comité concernant l'uniformité des poids et mesures. (18 pp. 4to.)

17. Resolutions of the committee concerning coinage. (2 pp. 8vo.)

18. Circular of M. Mathieu, president of the committee, dated 29th November 1867, for re-constituting the International Association of weights, measures, and coins, with proposals for the general government of the association, and of the French and English branches. (13 pp. 4to.)

19. Copy of circular of International Association to governors of British colonies. Dated 25th January 1869. (3 pp. 4to.)

20. Narrative of the origin and formation of the International Association for obtaining a uniform decimal system of weights and measures. By J. Yates, M.A. London. 1856. (56 pp. 8vo.)

21. Account of the plan, objects, and progress of the International Association, &c. By S. Brown, F.R.G.S., &c. Liverpool, 1858. (12 pp. 8vo.)

22. On a uniform system of weights, measures, and coins for all nations. By H. Hennessy, F.R.S., &c. London, 1858. (30 pp. 8vo.)

23. On the French system of measures, weights, and coins, and its adaptation to general use. By J. Yates, M.A. London, 1854. (From Proceedings of Institute of Civil Engineers, vol. xiii., 95 pp. 8vo.)

24. What is the best unit of length ?* By J. Yates, M.A. London, 1858. (77 pp. 8vo.)

25. On the Metric system of weights and measures, and the desirableness of its universal adoption. By Rev. J. Scott Porter. London, 1859. (23 pp. 8vo.)

26. Memorial of International Association on decimal weights. London, 1859. (15 pp. 8vo.)

27. Improvements in arithmetic, and a vindication of the decimal principle. By J. Yates, M.A., and Rev. A. Barrett, M.A. London, 1860. (24 pp. 8vo.)

28. The Metric system; its prospects in this country. London, 1863. (32 pp. 8vo.)

29. On the Metric system of weights and measures. By L. Levi, F.S.A. London, 1863. (15 pp. 8vo.)

30. Impediments to the introduction of the Metric system and the best way to remove them. By F. P. Fellows. London, 1863. 56 pp. 8vo.)

The attention of the members of the Commission may be called to the information contained in these publications, more especially the annual reports of the International Association, as showing the progress of public opinion of late years as to the question of an international system of weights and measures, and the names of the numerous distinguished and scientific persons by whom it is advocated.

Their u... meets ap... proval ... Metric ... system.

It is to be observed that the opinions of the Association are unanimous that such an international system must be based on the Metric decimal system as established in France. The four fundamental principles unanimously agreed to by the committee at the Paris Exhibition of 1867 were,—

1. That the decimal system, being in conformity with the system of numeration universally employed, is the most proper for expressing the multiples and parts of weights, measures, and coins.

2. That the Metric system is perfectly fit to be universally adopted, on account of the scientific principles upon which it is established the homogeneity which exists in the relations of all its parts, and the simplicity and facility of its application in the sciences and arts in industry and commerce.

3. That the instruments of precision and methods employed for obtaining copies of the original standards have attained such perfection that the accuracy of these copies meets every requirement of industry and commerce, and even the exigencies of modern science.

4. As every economy of labour, both material and intellectual, is equivalent to an actual increase of wealth, the adoption of the Metric system, which may be ranked in the same order of ideas as tools and machines, railways, telegraphs, logarithms, &c., particularly commends itself in an economical point of view.

It will be unnecessary further to quote from this report the arguments advanced in favour of the Metric system. The committee conclude by stating their opinion that both the internal and external commerce of every nation must be greatly benefited by its adoption, either in particular countries only, or still more as an universal system of weights and measures.

Great stress is laid by the International Association and by the advocates of the Metric system of the saving of time in education which would result from its general adoption. The following is an extract from the memorial to the Chancellor of the Exchequer from the International Association, presented 19th March 1859 (p. 21.)

Allowed ... Eng... in ... educa...

"VII. Another most important consideration is the saving of time in education. Those who are

* Reference is made in this paper to Professor Playfair's A... the Metric System in the Edinburgh Review, Vol. V., IX., ... XXX.; reprinted in Playfair's Works, Vol. IV., 1860; as well as ... works upon the same subject.

employed in training boys for commercial pursuits bear a unanimous testimony to the irksome labour of teaching the tables of weights and measures, and the system of aritbmetic long established in this country, and they declare that the introduction of the Metric system would be equivalent to the saving of at least a year to them and their pupils. This year is generally lost, because the weights and measures are for the most part forgotten as soon as learnt."

In truth, it is to the advantages possessed by the Metric system, in its application of a uniform decimal scale to weights, measures, and coins, by means of which any amount can be expressed under a single denomination, thus simplifying computations, and avoiding long and difficult reductions, that the looked-for results are wholly attributable. The decimal system has indeed been described as a labour-saving machine.

utions d at rence b. 1868.

It appears to be of importance that the resolutions passed in Februay 1868, at a conference between the Council of the British Branch of the International Association, the Metric Committee of the British Association, and deputies from the Chambers of Commerce of the United Kingdom, should be brought under the notice of the Standards Commission. They are extracted from the Tenth Report of the International Association in 1868, p. 11, and are as follows :—

" That the permissive use of Metric weights and measures in the United Kingdom, without corresponding powers for legalizing authorized standards of the same, and the stamping of Metric weights and measures in use, is calculated to cause much inconvenience in trade, and to frustrate the practical adoption of the system; and that it is therefore desirable that the Department of the Board of Trade charged with the custody of imperial weights and measures be also authorized to provide and maintain the standards of Metric weights and measures, and stamp and verify those in general use.

" That, in order to facilitate the use of the Metric system, it is desirable that the same be introduced into the Public Departments, especially in the Post office and the Customs, by the official preparation of the tariff in Metric equivalents, with authority to levy duty according to the same, and the publication of the principal results of the statistics of the Board of Trade in Metric and Imperial values.

" That this conference recommend the Chambers of Commerce of the United Kingdom to use means for promoting the voluntary use of the Metric system among merchants, manufacturers, aud tradesmen such as the preparation of special tables available in the various trades for converting prices and quantities from the Metric into the Imperial system, and vice versâ ; and the exhibition of mural standards of the metre in public places in the principal ports and market towns."

ort of lts and ures mittee.

The last evidence which I shall bring before the Commission of the progress of public opinion in this country as to the introduction of the Metric system, is that of the proceedings in Parliament. And first, as to the Weights and Measures Committee of 1862. That Committee was composed of members who formed opinions entirely favourable to the introduction of the Metric system, and the terms in which their recommendations are framed in their rqport deserve particular notice.

They "arrived at a unanimous conclusion, that the " best course is cautiously, but steadily, to introduce " the Metric system into this country," and they recommended,—

1. That the use of the Metric system be rendered legal. No compulsory measures should be resorted to until they are sanctioned by the general conviction of the public.

2. That a department of weights and measures be established in connexion with the Board of Trade. It would thus become subordinate to the Government and responsible to Parliament. To it should be in trusted the conservation and verification of the standards, the superintendence of inspectors, and the general duties incident to such a de artment. It should also take such measures as may from time to time promote the use and extend the knowledge of the Metric system in the departments of Government and among the people.

3. The Government should sanction the use of the Metric system (together with our present one) in the levying of the customs duties, thus familiarizing it among our merchants and manufacturers, and giving facilities to foreign traders in their dealings with this country. Its use, combined with that of our own system in Government contracts, has also been suggested.

4. The Metric system should form one of the subjects of examination in the competitive examinations of the Civil Service.

5. The gramme should be used as a weight for foreign letters and books at the Post-office.

6. The Committee of Council on Education should require the Metric system to be taught (as might easily be done by means of tables and diagrams) in all schools receiving grants of public money.

7. In the public statistics of the country quantities should be expressed in terms of the Metric system, in juxtaposition with those of our own, as suggested by the International Statistical Congress.

8. In private bills before Parliament the use of the Metric system should be allowed.

9. The only weights and measures in use should be the Metric and Imperial, until the Metric has been generally adopted.

Progress of Metric Bills in Parliament in 1863.

As a consequence of the report of the committee of 1862, a bill to introduce the Metric system was introduced in the following session, founded on their recommendations ; but it also contained the provision that it should be made compulsory at the expiration of a period to be fixed by the bill. A period of three years was inserted in the draft of the bill, although it was stated by its promoters that a longer period might be fixed, as might be judged expedient or necessary. The compulsory provision was objected to by the Government ; but on a division the second reading was carried by 110 against 75, on July 1, 1863.

in 1864.

The lateness of the session prevented the bill from being then proceeded with ; but it was re-introduced in 1864 as a permissive bill only. The second reading on 10th March was not opposed by the Government, and was carried on a division by 90 against 38. In committee, on 4th May, the Government objected to the provisions for legalizing Metric standards and weights and measures, there being no arrangements for providing them, and proposed themselves to substitute a new bill, rendering the Metric system permissive in this country so far as related to contracts. This proposal was acceded to, and the bill finally passed as the Metric Act of 1864, though not until after a division upon the second reading in the House of Lords, on 21st July of 34 against 23.

and in 1868.

In 1868, another bill was brought in, to repeal the Act of 1864, and introduce the Metric system compulsorily after a period to be fixe' in the bill, which period was left to be inserted by the Government. Upon the second reading of the bill, on 13th May 1868, it was not opposed by the Government, on the understanding that they did not object to its principle, but that further information was required before the question could be properly dealt with, and was then being obtained by the Standards Commission, and that the bill should not be proceeded with until the report of the Commission had been received. This understanding was assented to by the promoters of the bill, and the bill was read a second time after a division of 217 against 65.

Full and corrected reports of the discussions upon these occasions are amongst the publications of the International Association laid before the Commission.

Conclusion —Metric system to be adopted as an international system.

The time has now arrived when all the evidence that appears to be required to form their judgment has been placed before the Standards Commission, and when the whole question has become ripe for their opinion to be given upon it. Upon full consideration of all the circumstances, and after the adoption of the Metric system by so many other countries, and the influential and increasing support it has met with here, I am myself led to the irresistible conviction that the full introduction and legalization of the Metric system in the United Kingdom can no longer be delayed. Considering the extent and importance of our commercial and scientific intercourse with so many nations who have adopted the Metric system of weight and measures, and that it has now become really a widely extended international system, it appears to me that this country can no longer isolate herself from other countries in her system of weights and measures, and refuse to adopt that common method of computing the quantities of all merchandise and other articles passing between them which so many other nations have already accepted.

Its nomenclature.

With regard to the legal names to be given to Metric weights and measures in this country, the French nomenclature has already to a certain extent been adopted in the schedule to the Metric Act of 1864. Nor does there appear to be sufficient reason for making any alteration. These names are derived from Greek and Latin words, applicable to the decimal multiples and parts respectively. Although there are well-grounded objections to them on account of their inconvenient length and occasional similarity both to the eye and ear, (for instance, decametre and decimetre), yet the general advantage of adopting in an international system not only uniform weights and measures but also uniform names outweighs all such objections. The arguments in favour of one tell as much in favour of the other. If the Metric system were generally accepted and used in this country, the names would probably soon be shortened. In France, at the present time a kilogram is generally called a *kilo*.

Questio its comp sory or missive adoptio home pu poses.

The question remains, to what extent the Metric system should be introduced by law into this country, whether not only as an international but also as a national system of weights and measures; as concurrent with the existing Imperial system, or to be substituted for it compulsorily after a fixed period; in other words, which of the two systems is practically the best adapted for the internal transactions of trade in this country.

Relative amounts and mer of foreig and hon trade.

There are no means of stating the actual amounts of the foreign trade and of the home trade in the United Kingdom, with a view to their comparison. But so far as can be ascertained from the official returns of the Board of Trade, the relative amounts of the total foreign commerce of the United Kingdom, and of that portion of it which affects the internal trade of this country, together with their relative increase within recent years, may be stated as follows :—

——	In 1854.	In 1866.	Increase per Cent.	Decrease per Cent.
Total real value of exports and imports (exclusive of bullion and specie).	268,210,145*l.*	534,195,956*l.*	99	—
Total declared real value of British produce exported.	97,184,726*l.*	188,917,536*l.*	94	—
Quantities of cocoa, coffee, and tea, retained for home consumption.	103,756,494 lbs.	136,948,900 lbs.	32	—
Ditto sugar - - - - -	8,028,758 cwt.	10,297,196 cwt.	28	—
Quantities of wheat, barley, and oats sold in the various market towns.	6,946,692 qrs.	5,112,925 qrs.	—	26
Ditto imported, including maize and flour* -	1,999,920 qrs.	5,791,862 qrs.	189	—
Total - - - -	8,946,612 qrs.	10,904,787 qrs.	22	—
Estimated value of coal and metals produced in the United Kingdom.	29,155,701*l.*	40,310,933*l.*	38	—
Total population - - - -	27,658,704	29,935,404	8	—
Total number of letters delivered in the United Kingdom.	443,649,301	750,000,000	69	—

With respect to the proportion between the numbers of foreign and home letters, the Tenth Report of the Postmaster General for 1864 (p. 27) states, "The foreign and colonial letters coming into the "United Kingdom for delivery are about 1-50th of "the whole number delivered, and the letters des- "patched to foreign countries are nearly equal in "number to those received."

The relative amounts of duty received in 1866 on inland and on foreign bill stamps are stated by the Inland Revenue Department to be 429,654*l.* and App. IV. 1. 352,672*l.* respectively. The maximum rate being 1*s.* per cent., and the average rate about 1*s.* 2*d.* per cent., these sums represent transactions to the amount of about 740,000,000*l.* and 600,000,000*l.* But these amounts afford no satisfactory evidence of the proportion which foreign trade bears to home trade, as probably the great bulk of foreign trade is carried on financially by means of bills, whilst in the home trade the reverse is the fact.

Mr. Derbyshire, the chief inspector of the Bankers' Clearing House, states that the amount of cheques and bills passed through in the year ended May 1868 App. IV was 3,257,411,000*l.*, whilst the amount in the year 1839 is computed by him at 891,592,000*l.*, showing an increase of 360*l.* per cent. The largest amounts in any one day in the respective years were 23,204,000*l.* and 6,209,900*l.*, showing a nearly corresponding percentage of increase. It should be noticed that this great increase is not due to the trade of the country alone, but in a great extent to the large amount of Stock Exchange operations; and that most of the old London bankers, including the Bank of England, do not clear through the clearing house. Again, the amount actually passed through the clearing house, and having reference to trade, represents only the transactions in the metropolis; to afford any evidence of the amount of our home trade, there should be added to it the very large, though not hitherto ascertained amount, of transactions throughout the rest of the kingdom.

* The amount is stated in the Statistical Abstract in cwts., taking 1 cwt. of wheat flour to be equal to 1½ cwt. in grain. The quantity is here stated in quarters, taking the average quarter to be equal to 4 cwts. There is a doubt as to the accuracy of the information furnished of the quantities of grain sold in market towns.

Although, therefore, it is not possible to state, or even to estimate with any approach to accuracy, the relative amounts of our foreign and home trade, yet the actual fact of the very small proportion of the number of foreign letters to that of home letters, points significantly to the assumption that the number of foreign trade transactions, involving the use of weights and measures, must be small indeed compared with that of similar home trade transactions. It should also be remembered that whilst every foreign trade transaction is the subject of correspondence, nearly all the small retail transactions of trade at home are effected without any letter passing through the post. On the other hand, the facts of the real value of our exports and imports having increased 99 per cent. in 12 years, from 1854 to 1866, whilst our population has increased only 8 per cent., and the home consumption of many of the necessaries of life has not increased 30 per cent., all tend to prove the far larger relative increase of our foreign trade within this period.

It should be observed that whilst the total value of exports and imports, both to foreign countries and British possessions, has increased 99 per cent., the greatest increase has been to foreign countries, being 105 per cent., that to British possessions being 83 per cent.; the increase of the value of British produce exported to foreign countries has been 113 per cent., and to British possessions 60 per cent.

There are several points to be considered in connexion with the question now raised, of the adaptation of the Metric system to internal trade, which not only involve a comparison between the relative inherent merits of the Metric and Imperial systems, but require that the actual facts in regard to the weights and measures of this country, and the people by whom they are used, should be duly taken into account.

So far as concerns its alleged inherent advantages, the Metric system has been described by its advocates as not only a scientific system, but as *the* scientific system of weights and measures. This is an assertion which will hardly bear the test of examination. A system of weights and measures to be used by the people must be a practical one. A scientific system of weights and measures must therefore be a practically scientific system, and not be merely theoretically scientific. Judged by this rule, what is the Metric system?

First, as regards its units. The metre, the basis of the system, is declared to be a supremely scientific unit, based upon the length of the circumference of the earth itself, and ascertained by a scientific process to be the ten-millionth part of the meridian quadrant, as determined by actual measurement. In the first place no accurate measurement of the whole meridian quadrant is possible; secondly, it has been shown that the length of a quadrant of the meridian, that is to say, the distance of the equator from the pole, must vary in the different degrees of longitude; thirdly, it does not appear that the slightest really practical advantage has been or could be obtained by establishing this relation between the metre and the meridian quadrant, even if it were actually and truly established, beyond the mere fact of determining *a* standard of length; and lastly, the metre is generally admitted not to be what it professes to be; scientifically speaking, it is *not* the ten-millionth part of the meridian quadrant.

In truth the metre, as the unit or base of the Metric system, has no other merit than being an established standard. It has no inherent scientific superiority over the yard, and for practical purposes it may be doubted whether its length is as convenient as that of the yard. The yard has been adopted in this country as the legal standard unit of length, because it was practically found to be a convenient measure. It is the average length of the extremity of the outstretched arm from the mouth of a man. It is also a particularly convenient measure for women's use, as proved by the fact that it is the universal practice for milliners, dressmakers, and others, to compute by it and measure their materials for work, by merely taking the length from the end of the second finger to the knuckle, as $\frac{1}{3}$ yard, doubling it for $\frac{1}{4}$ yard, and so on. The yard has been in actual use in England as the measure of length from the time of the Saxon kings, and there has never been a question of its actual standard length. In the memory of man there has never been but one yard throughout England.

The alleged scientific relation between its units.

Again, the Metric system is described as a scientific system, because of the simple and definite relation between the metre, its basis and unit of length, and the kilogram and litre, the units of weight and capacity. But although this relation exists in theory, it is admitted that it has been found impossible practically to carry it out with scientific accuracy. The standard kilogram is admitted *not* to be actually the weight of a cubic decimetre of pure water at the specified temperature, nor the litre a measure of capacity holding a cubic decimetre of pure water at its maximum density. The real standard unit of weight is declared, even by men of science in France, to be merely the platinum kilogram weight deposited at the Palais des Archives, as the real standard unit and basis of the Metric system is the platinum metre also deposited there. There is no material standard litre to represent the unit of Metric capacity. Nor does much practical advantage seem to have been derived from the theoretical existence of this relation between the units of Metric length, weight, and capacity.* As regards the Imperial system, there is no simple and definite relation, either theoretically or practically, between the units of length and weight, the yard, and the pound, although the weight of a cubic inch of distilled water is specified in the Act which established the Imperial system, and the relation between the cubic foot and the avoirdupois pound is also accurately defined. But the scientific relation between the unit of weight and of capacity, the pound and the gallon, is practically carried out, and constitutes the real test of the accuracy of Imperial standard measures of capacity, whilst the cubical contents in inches of the gallon are defined by law.

See App. II., p. 29.

And scientific construction of standards.

As regards the actual construction of the standards themselves, and the scientific methods employed to secure their accuracy, the Metric standards have certainly no advantage over the Imperial standards.

Real advantage in its uniform decimal scale, though wanting binary subdivisions

One real advantage which the Metric system possesses over the Imperial system consists in the simplicity and uniformity of its decimal scale, and its convenience for all purposes of computations, from its agreeing with the established decimal system of notation, as compared with the unscientific variety of scales in the Imperial system. But such as these last are, it should be remembered that they have been adopted because they were found to be practically adapted to the wants and habits of the English people. The Imperial system has, moreover, the very useful binary scale of subdivision, which is wanting in the Metric system.

and in uniformity of weights, as compared with imperial weights.

The Metric system has a further advantage over the Imperial system in the uniformity of its unit and scale of weight. We have three distinct systems of weights legalized and used in this country, the avoirdupois, with its pound of 7,000 grains, as the unit and the imperial standard of weight; troy weight, with its pound of 5,760 grains, the old standard of weight; and decimal bullion weight, with the troy ounce as unit. If the Imperial system is to continue as the established system in this country, it would be well to consider the expediency of simplifying our system of weights.

Suggestions of discontinuance of imperial troy weight.

Troy weight has now been abandoned by the medical authorities as the basis of apothecaries' weight, and avoirdupois weight substituted. The grain, formerly the basis of troy weight, has now been legalized as an avoirdupois weight, the Imperial standard pound having been declared to be equal to 7,000 grains. The troy ounce alone is practically in use, but it is also found in decimal bullion weight. Information has recently reached the Standards Department that up to

* See further, App. VI. on this subject.

the present time it has been the practice for the inspectors neither to stamp nor to inspect troy weights used for trade purposes. Under these circumstances it may become matter for serious consideration whether troy weight, including the troy pound, troy ounce (leaving perhaps the bullion ounce only), troy pennyweight, and troy grain, with their multiples and parts, may now be discontinued as legal weights. The grain, as an avoirdupois weight, with its proposed decimal scale, when legalized, will remain available for use in weighing very small quantities.

uestion of practicability of now introducing compulsorily.

But all these are comparitively minor points in comparison with what must really determine the question now under consideration ; I mean the *practicability* of *compelling* the British public to substitute the Metric system for the established Imperial system of weights and measures. You may indeed pass an Act of Parliament to make the use of the Metric system compulsory after a specified period. But does not the very term "compulsory imply that the public will not willing accept it ? Can you by any process of law practically enforce it against the wishes of a people so fixed in their habits and accustomed to self-government as the English people, over whom the executive Government has so little real power of compelling obedience to the law in all the small transactions of trade throughout the kingdom ? Is it not nearly a matter of certainty that the public will not, within any reasonable time that can now be specified, willingly change all the weights and measure they now possess and use, and to which they are accustomed ? All history shows that in regard to weights and measures in this country, the law has followed and confirmed the custom of the people, and that the habits of the people have not been dictated to and enforced by the law.

Reason for enforcing it on other countries not found here.

One important ground for the compulsory substitution of the Metric system instead of the existing weights and measures used in internal trade in other countries, for instance, France, Germany, India, &c., does not exist in the United Kingdom, viz., the want of uniformity in the units. Even in Germany it has been shown that the units of length, weight, and capacity vary more or less in all the separate states of the Confederation. In the United Kingdom there is but one yard, one avoirdupois pound, and one gallon.

Difficulties in compulsory introduction.

If Parliament were now to pass a law to compel the substitution of the Metric for the Imperial system, what would have to be done to carry out such a provision ? It seems hardly necessary to remind the Standards Commission that the existing Imperial standards, constructed and verified under their immediate superintendence, and combining the highest possible perfection of mechanical skill and of scientific accuracy, will at once become useless for all practical purposes, and will remain only as objects of historical interest. But the real difficulty is not in dealing with the standards themselves, but with the vast number of local standards, and of weights and measures in use throughout the kingdom. In Papers XII. and XIII. laid before the Commission, accurate and detailed information has for the first time been furnished of the number of local standards of the existing system, and of the number and denomination of ordinary weights and measures stamped by the inspectors in a single year. They are as follows :—

Total Number of Local Standards used by Inspectors of Weights and Measures in the United Kingdom, and of ordinary Weights and Measures stamped by them in the year ended 31st December 1866.

Number of standards and weights and measures now in use.

	Weights.			Measures.			Weight and Measures not distinguished.	Total.
	Avordupois.	Troy.	Bullion.	Capacity.	Length.	Gas.		
					Yards.			
Local Standards in the United Kingdom.	12,964	1,035	323	7,309	736	158	—	22,597
Sub-Standards used in Ireland.	8,244	—	—	5,008	467	—	—	13,319
Weights and Measures stamped in 1866.	1,784,102	544	355	450,683	30,943	78,182	77,360	2,422,169

This information is based upon the returns from the several inspectors made to requisitions from the Standards Commission. So far as can be ascertained, there are now in the United Kingdom, 1,381 inspectors of weights and measures, having their separate districts of inspection. No return was received from 150 of these inspectors, including the county inspectors of Hampshire, Staffordshire, and the West Riding. There are also 55 districts which have adopted the Sale of Gas Act of 1859, and where as many inspectors of gas meters are appointed. Returns have been made from only five of these districts, including the Metropolitan district. It is evident, therefore, that considerably more than 2,500,000 imperial weights and measures were stamped by inspectors in a single year 1866, and it must be remembered that it has not hitherto been the practice to stamp troy weights exclusively used by chemists, jewellers, watchmakers, &c., nor any of the subdivided foot and other measures of length, except the yard rod used in certain shops. The number stamped in one year is probably not more than one-tenth of the whole number of imperial weights and measures in actual use throughout the United Kingdom, and it may therefore be fairly estimated that the total number in use is nearly 30 millions. All these would become useless and illegal, and others of the new system would have to be substituted for them.

No valid argument against eventual adoption of the Metric system.

It may at once be admitted that this is no valid argument against the *eventual* uniform adoption of the Metric system in this country, or a similar argument would have prevented its adoption in any country. But it is part of the evidence which may be taken into account as showing the expediency of not hastily adopting any compulsory measure. All that has been stated appears to me to be conclusive to prove that at the present time the recommendation of the Select Committee of 1862 should be acted on, and that *the Metric system should be introduced into this country cautiously, and no compulsory measures resorted to, until they are sanctioned by the general conviction of the public.*

Conclusion —No compulsory measure should be now adopted.

Best course for ultimately establishing the Metric system.

I am satisfied also that this is the best means of arriving eventually at the objects which the most strenuous of the advocates of the Metric system have in view,—its actual establishment in this country as the national and uniform system of weights and measures. A long time must elapse before this can be effected, and there is still much to be done. As regards the new system itself, the official Metric standards have to be provided and duly verified, and the regulations have to be determined under which the Metric system must be introduced. But whether applicable to the new or

the existing system, there is now an urgent want that the whole system of inspection of weights and measures throughout the country should be completely re-organized, and be placed more or less under Government control, to secure uniformity and legality of action. This is a subject to which the Committee of 1862 alluded in connexion with the introduction of the Metric system, and it has now been referred for the consideration of the Commission, and their attention will next be directed to it.

There will be a better prospect of establishing the Metric system in this country when there is a better organization for the execution of the weights and measures law. At present there is no sufficient machinery in existence for practically establishing it by a compulsory law. And if the Metric system really possesses the advantages that its advocates allege, it must make its way by degrees to its general acceptance in this country, when it has once been fairly introduced.

But it is of the utmost importance that a measure affecting the whole of the weights and measures of the country should be introduced into Parliament with the sanction and authority of the Government and under their responsibility. The defects of the existing system are mainly attributable to this essential point having been altogether neglected. The Act of 1824 for constituting the existing Imperial system, the several Acts amending it, especially the Acts of 1835 and of 1859, for establishing the present system of inspection, and for requiring the periodical re-verification of local standards, were all introduced into and carried through Parliament by private members; so was the Sale of Gas Act in 1859. The Metric Bills of 1863, 1864, and 1868 were also similarly introduced. A good precedent has been afforded in 1864, when the Metric Bill was withdrawn by its promoters and an amended bill introduced and carried through Parliament by the Government. I am informed that it has been resolved by the International Association that another Metric Bill should be introduced into the House of Commons early in the present session, but my informant, the member who has undertaken to introduce it, has assured me that it will most willingly be left in the hands of the Government if they will undertake it.

One important point remains to be noticed, that the French Metric system includes the relation of the coinage to weights and measures, in regard to the weight and dimensions of the coins and their decimal scale, and that this was considered essential for its completion. The International Association takes a similar view of the importance of uniformity in the coinage as well as in the weights and measures of the several nations. Although this point has not been referred to the consideration of the Commisssion, it should not remain entirely unnoticed in reviewing the whole question of the introduction of the Metric system into this country, and a brief reference may be made to the proceedings which have taken place with regard to the decimalization of our coinage, together with that of weights and measures, and to the question of an international coinage, which will show the important relations which the subject of international coinage bears to that of international weights and measures.

In the report of the Standards Commission in 1841 they called attention to the general question of the decimal scale, and the advantage and facility of establishing a decimal system of coinage. They added,—

"We have felt it imperative to advert to the subject, because no circumstance whatever would contribute so much to the introduction of a decimal scale in weights and measures, in those respects in which it is really useful, as the establishment of a decimal coinage."

On 26th March 1853, the Commissioners addressed a letter to the Chancellor of the Exchequer, strongly urging the advantages of a decimal system of coinage on the pound and the mil scheme, and that practical steps should be taken with that object.

In the report of the Select Committee of the House of Commons on decimal coinage in 1853 they say,—

"A further evidence of the value of the decimal system is to be found in the fact of its very general adoption in the different countries of the world, not only in the case of money, but also as respects weights and measures."

And after recommending a decimal system of our coinage, based on the pound sterling, and known as the pound, florin, cent, and mil scheme, they add,—

"The attention of your Committee has been incidentally directed in the course of their inquiries to the advantage of applying the decimal system to weights and measures as well as coins. This being a question not embraced in their order of reference, your Committee do not feel themselves in a position to do more than express their sense of the importance of further enquiry into that interesting subject."

The Decimal Coinage Commission appointed in 1855 made two reports. In their preliminary report in 1857 they adverted to the report of the Weights and Measures Commission of 1819 as being opposed to a decimal scale, and recommending that the existing multiples and parts of weights and measures were far preferable and should be retained. They further stated that the important questions of the decimalization of our weights and measures and of international coinage were early forced upon their notice, but that they were obliged to restrict their investigations to the subject of a decimal coinage, without contemplating any change in the existing system of weights and measures, or considering any advantages in an international system of coinage.

In the final report of the Decimal Coinage Commission in 1859 they referred to the pound and mil scheme as the only possible one that could be adopted, but looked upon it as an experiment of very doubtful result, and attended with many difficulties. Their most important recommendation was as follows:—

"That it does not appear desirable, under existing circumstances, while our weights and measures remain as at present, and as long as the principle on which their simplification ought to be founded is undetermined, to disturb the established habits of the people with regard to the coins now in use by a partial attempt to introduce any new principle into the coinage alone."

The International Coinage Commission of 1868 was appointed in consequence of the proceedings at the International Monetary Conference held at Paris during the Exhibition of 1867. Their report recites the various measures which had been adopted for introducing an international coinage, and that the difficulties of arranging tariffs of duties with different countries were materially enhanced by the difference of monies, weights, and measures. They stated their opinion that while some advantage would be derived from a system of international coins, the full advantages anticipated in various ways could only be attained by a general system of international currency, and that to accomplish this object, a General International Conference would be the best means of reconciling the conflicting views of the different countries. They entertained no doubt that these advantages would be still further increased by an assimilation of weights and measures. This latter question not having been referred to them, they only added that they did not consider it necessary that any measures for the assimilation of the currencies of the principal nations of the world should be postponed until steps are also taken for the assimilation of weights and measures.

Under these circumstances it may be a matter for the Commission to consider whether the relation that exists in the Metric system between weights and measures and coins, does not render it expedient that they should express an opinion upon the establishment of an international coinage or the decimalization of our existing units of coinage.

IV.—Practical Suggestions for dealing with the Question of the Introduction of the Metric System into the United Kingdom.

If the preceding views should generally meet with the concurrence of the Commission, it may be convenient that this paper should conclude with some practical suggestions for carrying them out.

Expediency of distinctive forms or marks for Metric and for Imperial weights, &c.

Upon the Metric system being introduced here, either permissively or even compulsorily after a specified time, the two systems must for a longer or shorter period be used concurrently. There is no possibility of avoiding this evil and of breaking through the principle of legal uniformity in our weights and measures, the enforcement of which has been attempted ever since the Norman Conquest. But practical means may be devised for preventing to any great extent any mischievous consequences of mistaking or fraudulently substituting one set of weights or measures for the other, thus concurrently used, by the legal adoption of distinctive forms or marks. For instance, many of the Metric weights in France are obliged by law to be in the form of a hexagon. A legal regulation may enforce that all Metric weights in this country should be hexagonal, and they would thus be easily distinguishable from imperial weights, which are generally either nearly cylindrical or square, and this distinction of form may be made compulsory by law. Again, measures of capacity for liquids in France must be made of a specified metal and form, and there are also special regulations for the material and form of all other measures in ordinary use. The same principle adopted with regard to measures as has been mentioned with regard to weights would easily prevent those of the Metric system from being mistaken from those of the existing system. As regards length measures, all Metric measures of length may consist of square or octagonal rods, or, if they be chains, have a square piece on every link. It may also be a matter for consideration whether a printed notice of the use of metric weights and measures, to be supplied by the inspectors, should not be openly exhibited in shops or places where they are used.

Detailed regulations to be framed hereafter.

Before, however, the Metric system can be practically introduced here, detailed regulations must be framed upon the subject. The existing regulations in France have been shown in great detail in Paper XV., and will serve to facilitate the consideration of what may be required in this country, not only with regard to the Metric system, but to the improvement of our existing system of local inspection of weights and measures. The latter subject will very shortly be brought before the Commission to be dealt with by them. Any detailed regulations applicable to the Metric system must be left for future consideration, when the general question of its introduction into this country shall have been decided by the assent of the Government and the Legislature. It would be desirable that the Commission should hear the evidence of practical makers of standards and of weights and measures, before recommending any distinctive forms for those of the Metric system.

Proposed resolutions for consideration of Commission.

I have now only to suggest the mode in which the opinion of the Commission may be given, by assenting to resolutions to the following effect, in the framing of which the valuable aid of the Chairman of the Commission has been given:—

1. That from information which has been laid before the Commission—

Of the great increase during late years of international communication, especially in relation to trade and commerce;

Of the general adoption of the Metric system of weights and measures in many countries, both in Europe and other parts of the world, and more recently in the North German Confederation and the United States of America;

Of the progress of public opinion in this country in favour of the Metric system as a uniform international system of weights and measures;

And of the increasing use of the Metric system in scientific researches, and in the practice of accurate chemistry and engineering construction;

> We are of opinion that the time has now arrived when the law should provide and facilities be afforded by the Government for the introduction and use of Metric weights and measures in the United Kingdom;
>
> That for this object Metric standards accurately verified in relation to the primary Metric standards at Paris, and deposited in the Standards Department of the Board of Trade, should be legalized; and that verified copies of the official Metric standards should be provided by the local authorities for inspectors of such districts as may require them.

2. Considering the advantages of adopting in an international system not only uniform weights and measures, but also uniform names; and that although there may be well-founded objections to the inconvenient length and occasional similarity, both to the eye and ear, of the French nomenclature, yet it is probable that these names will become familiar by custom and obtain popular abbreviations;

> We think that the French nomenclature, as well as decimal scale of the Metric system, should be introduced in this country.

3. Considering—

That there is no immediate cause requiring a general change in the existing system of legal weights and measures of the country for the purposes of internal trade;

That the statutable values of the fundamental Imperial units are adopted in use without the slightest variation, throughout the whole of the British isles;

That the primary imperial standards are as perfect as can be made by modern skill and science, and that the whole series of official standards are now most accurately verified in relation to the primary standards;

That a very large number of copies of the official imperial standards, accurately verified, are now in use by the local inspectors of weights and measures;

That it is estimated there are nearly 30 millions of ordinary weights and measures of the existing Imperial system now in common use;

That at the present time there is no evidence to show that any considerable portion of traders and their customers in this country are dissatisfied with the Imperial system now in use, or that they desire to substitute the Metric system for it;

> We are of opinion that the general introduction of the Metric system should be permissive only, and not made compulsory by law after any period to be now specified, so far as relates to the use of Metric weights and measures for weighing and measuring goods for sale or conveyance;

4. Considering that during the concurrent use of the Metric and Imperial systems, it will be expedient to prevent, as far as possible, Imperial and Metric weights and measures from being accidentally or fraudulently substituted for each other;

> We are of opinion that authoritative regulations should be established, under which each series may be readily and easily distinguished, by the adoption of conspicuous distinctive forms or marks for the several weights and measures, and by such other mode as may be determined upon after due inquiry.

5. That it is expedient customs duties should be allowed to be levied by Metric weight and measure, as well as by Imperial weight and measure. That the use of the Metric system, concurrently with the Imperial system, should be adopted by other public departments, especially the Post Office, and in the publication of the principal results of the statistics of the Board of

Trade; as well as for the admeasurement and registration of the tonnage of shipping;

6. And that mural standards of the Metric system, as well as of the Imperial system, be exhibited in public places.

7. Considering that the metric system, as adopted in other countries, includes the relation of the coinage to weights and measures, particularly in its uniform decimal scale;

That the advantages of the introduction of the Metric system into this country as an international system of weights and measures would be much increased by establishing a corresponding international system of coinage, in regard to a unit and to a decimal scale;

We are of opinion that, even if the difficulties of establishing an international unit of coinage cannot be at present overcome, yet the decimalization of our system of coinage, which is in the power of the Government, would be very useful to the public.

8. Considering the great national importance of the question of the introduction of the Metric system of weights and measures into this country;

It appears to us essential that any measure for this object should be proposed to Parliament by the Executive Government.

9. Considering that the Commission will very shortly enter upon the questions referred to them relating to the system of local inspection of weights and measures throughout the United Kingdom.

We are of opinion that it is expedient that no legislation should take place with respect to the Metric system, until the whole subject of the weights and measures of this Kingdom be brought before Parliament in one Bill.

H. W. Chisholm,
Warden.

Standards Department, Feb. 22, 1869.

APPENDIX IV.

1. Account of the Number of Inland and of Foreign Bill Stamps sold, and the Amount of Duty received in the Years 1865–6, 1866–7, and 1867–8.
2. Letter from Mr. G. Derbyshire, Chief Inspector of the Clearing House, on the Amounts of Cheques and Bills passed through in the last Three Years.

1. An Account showing the Number of Inland and Foreign Bill Stamps sold, and the Amount of Duty received, in the Years ended 31st March 1866, 1867, and 1868.

Year ended 31st March.	* Inland Bills.		* Foreign Bills.	
	Number of Stamps sold.	Amount of Duty received.	Number of Stamps sold.	Amount of Duty received.
		£		£
1866 - -	5,861,214	429,654	2,514,679	352,672
1867 - -	5,997,703	421,941	2,504,476	323,368
1868 - -	6,106,435	389,450	2,670,546	314,610

* Minimum rate, 1s. per cent. Average rate, about 1s. 2d. per cent.

Inland Revenue Department,
18th March 1869.

2. Letter from Mr. G. Derbyshire, Chief Inspector of the Clearing House, on the Amounts of Cheques and Bills passed through for the last Three Years.

The Bankers' Clearing House,
Lombard Street,
15th March 1869.

Sir,

I regret that I am unable to furnish you with the amounts of cheques and bills passed through the clearing house for the last three years, from our returns having been kept only since May 1867. I can therefore furnish you with one year only, which from that date to May 1868 is 3,257,411,000*l.* This, however, will be of some value if compared with the return of 1839, which, although not taken for the year, can be made up from memoranda I have, and may be safely put at 891,592,000*l.* The largest amount that has passed through the clearing house on any one day in 1839 was 6,209,900*l.*, while the largest amount on one day in the year of our return, '67–68, was 23,204,000*l.* It must be borne in mind, however, that this great increase is not due to the trade of the country alone, but in some considerable degree to the very great amount of Stock Exchange operations, which on some settling days (when we pass through on occasions as much as 23,000,000*l.*) may claim for that share about half, or say 11,000,000*l.*, so that as there are settling days twice a month, you would have to deduct from the

£3,257,411,000
say 264,000,000

leaving £2,993,411,000 for the year as the purely commercial total.

The names or titles of the London banking firms using the clearing house are—

The Alliance Bank.
Messrs. Barclay & Co.
„ Barnes & Co.
„ Bosanquet & Co.
„ Brown & Co.
The Consolidated Bank.
Messrs. Dimsdale & Co.
„ Fuller & Co.
„ Glyn & Co.
The Imperial Bank.
„ London and County Bank.
„ London Joint Stock Bank.
„ London and Westminster Bank.
Messrs. Martin & Co.
The Metropolitan Bank.
„ National Bank.
„ National Provincial Bank.
Messrs. Rosenthal.
„ Robarts, Lubbock, & Co.
The Southwark Branch of London and Westminster.
Messrs. Smith, Payne, & Smith.
The Union Bank of London.
Messrs. Williams, Deacon, & Co.
„ Willis & Co.

The Bank of England has a seat in the clearing house, but does not positively clear, since it receives all that is due to it only, but credits to the accounts of the various bankers at the drawing office all it owes.

I have, &c.,
Geo. Derbyshire,
Chief Inspector.

To H. J. Chaney, Esq.,
Standards Commission.

Mem.—The following London banks do not clear:—

Agra Bank.
Albion Bank.
Alexander, Cunliffes, & Co.
Bank of Australasia.
„ England.
„ British Columbia.
„ British North America.
„ Egypt.
„ New South Wales.
„ New Zealand.
„ Victoria.
Biggerstaff & Co.
Chartered Bank of India, &c.
Chartered Mercantile Bank of India.
Child & Co.
City Bank.
Cocks, Biddulph, & Co.
Colonial Bank.
Commercial Bank.
Coutts & Co.
Drummond & Co.
East London Bank.
English and Chartered Bank.
Goslings & Co.
Herries & Co.
Hill & Sons.
Hoares & Co.
Hopkinson & Co.
Imperial Ottoman Bank.
Ionian Bank.
Lacey & Son.
London and South African Bank.
London and South-western Bank.
London and Australia Bank.
Merchant Banking Company.
Metropolitan and Provincial Bank.
Midland Banking Company.
National Bank of Scotland.
Oriental Bank.
Praeds & Co.
Provincial Bank of Ireland.
Provincial Banking Company,
Ransom, Bouverie, & Co.
Scott & Co.
Smith, Elder, & Co.
South Australian Bank.
Standard Bank of South Africa.
Stevenson, Salt, & Co.
Stride & Co.
Twining & Co.
Union Bank of Australia.
Union Bank of Ireland.

APPENDIX V.

On the Construction and Verification of the New Swiss Standard of Length, derived from the Metre.

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The new Swiss standard of length derived from the metre.

Reference has been made in Appendix III. (p. 100) to the new Swiss unit of length, being the foot of three décimètres, with a decimal scale of subdivision. It may be interesting to give a brief description of the new Swiss standard of length thus derived from the metre, including its mode of construction and verification, as shown in the official report printed by order of the Swiss Government. (*Bericht über die Arbeiten zur Reform der Schweitzerischen Urmasse, von Dr. H. Wild, Professor, Director der eidg. eichstätte in Bern, Zurich*, 1868. 170 pp. 4to.)

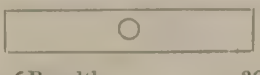
The Swiss standard brass metre.

The first step taken by order of the Swiss Federal Council on 5th November, 1862, was to procure through the French Government an accurately verified copy of the French Standard Mètre des Archives. A standard metre for Switzerland was accordingly made by Collot, at Paris, being of brass, and both a metre à-bout and à traits.

Its description.

The length of the metre à-bout is determined by circular gold studs in the middle of the two rectangular ends of the bar. One of these studs is fixed, the other is moveable by means of a brass screw working in the bar. The head of the screw is countersunk and can be moved through an opening left for this purpose, and it can be fixed by filling the opening with cement.

The size of each end of the bar is as follows :—



Its dimensions being, { Breadth = 36· millimètres. Depth = 6·3 „ Diameter of studs = 3·5 „

The length of the metre à traits is determined by the line formed at each end of the bar, by the contact of an additional piece of brass, which is fixed by a screw, a fine plate of gold being interposed.

Swiss crystal metre.

Another standard metre had been in the mean time constructed by order of the Swiss Government, by Steinheil, at Munich. It was of crystal glass with spherical ends. This glass metre was taken to Paris to be compared with the French standard metre, but it was found impossible to make the comparison by means of the comparing apparatus used at the Conservatoire des Arts et Metiers.

Verific of Swis standa brass m

The Swiss standard brass mètre à-bout was verified in Paris in 1863, by General Morin, M.M. Silbermann, and Tresca, and by MM. Wild and Morisson, who attended there on the part of the Swiss Government for that object. The metre à bout only was verified.

The comparison of the Swiss metre was made with the platinum mètre du Conservatoire, on two successive days, both bars being placed in melting ice. The following results appear from the procès-verbal :—

Comparison of the Swiss Brass Metre (S), with the Platinum Metre du Conservatorie (C).

May 2, mean of 9 observations of S and 11 of C:
S = C−0·0024 mm.
„ 4, „ 16 S and 16 C: S = C−0·0031 „

Mean S = C−0·00275 „ at 0° C.

In consequence of the reverification of the metric standards of the Conservatoire with the primary

standard of the Archives at the beginning of the following year, a further verification of the Swiss standard brass metre with the platinum metre du Conservatoire was made at Paris in 1864, by the same persons. On this occasion the bars were not placed in ice, but were compared at ordinary temperatures on two successive days, and at a higher temperature on the third day in a well-warmed room,

April 8, mean of 5 observations of S and 5 of C:
S = C + 0·08766mm at 9°·37 C.
„ 9, 3 S & 4 C: S = C + 0·08062 „ 8·69
„ 12, 6 S & 3 „ S = C + 0·24292 „ 25·06

Or reduced to the temperature of melting ice.

April 8 & 9 S = C − 0·00506
„ 12 S = C − 0·0055369

Mean S = C − 0·00530 at 0°.

This last result was taken as almost identical with that of 1863, and it was determined as a mean, S = C − 0·00528mm

The mètre du Conservatoire having been found on its reverification on 31st January and 11th February 1864 „ = 1·00000329 metre.
*** Swiss standard mètre = 0·99999801 metre at 0°.

In determining the mode of constructing the new Swiss standard of length to be derived from the metre, and its method of verification with the standard brass metre, it was considered that a line standard, and the method of comparison used in England by Sheepshanks, viz., optical measurement by a micrometrical apparatus, was preferable to Bessel's *fuhl-hebel* measurement of an end standard, or the contact lever apparatus, such as is used at Paris. Many reasons for this preference are assigned by Dr. Wild, in his Report.

The new Swiss standard of length was accordingly constructed as a line measure, and was made similar in all respects to the British Imperial standard yard. It was constructed by Messrs. Hermann and Studer, in Berne, and consists of a brass bar 20mm (0·78 inch,) square in section and 0·99 metre long. Two holes about 13·5 millimetres (0·53 inch) in diameter and 0·9 metre apart are drilled down to the middle of the bar. At the bottom of these holes are gold studs bearing the fine lines intended to define the length of three Swiss standard feet, or 0·9 metre.

For the comparison of the new Swiss standard with the standard metre, a new and elaborate micrometrical apparatus was constructed, having two large microscopes for observing the standard bars, and two smaller microscopes for the two thermometers placed between the bars under observation. The bars to be compared are placed in a double-cased frame of brass, and the space between the two cases is filled with 33 litres of water, in order to prevent any rapid change of temperature inside the frame. During comparisons the frame is covered with a tinned cast-iron plate with openings for observations, and the whole apparatus is further protected from external influences by a wooden frame opening in two halves. The light for observation is transmitted through a tube from a gas-lamp placed at each end of the apparatus.

Arrangements are made for fixing the two bars under comparison inside this frame parallel with each other and level. Immediately opposite to the ends of the bar to be compared two steel cylinders (*anschiebe cylinder*), made precisely similar, and moveable by means of a regulating screw, are placed in a fixed brass frame. One of these cylinders has a rounded point, the other a polished plane, perpendicular to the axis of the cylinder, and in the middle of the cylindrical part is a hole 10mm in diameter, drilled down to the axis, and having at the bottom a gold stud with a defining line. The end with a polished plane bears two lines perpendicular to each other, and crossing at the line of the axis. These cylinders serve as contact pieces to each end of a standard à-bout; when required to be compared under the microscopes, the length from the end of the cylinder to the defining line is taken into account.

In comparing the new standard with the standard metre the two bars were not compared directly with each other, but each was compared with an intermediate standard bar (*Normal-stab*), specially made for the purpose. This comparing bar is made of aluminium bronze, being like the new standard 20mm in section, but 1·1 metre in length. It is subdivided into millimetres marked upon a thin and narrow slip of silver rivetted upon the bar. Close to this subdivided slip and extending the whole length of the bar is a groove 3·6mm deep and 5·7mm wide, in which a smaller bar of aluminium bronze, 1 decimetre in length, with a similar slip of silver upon it, and on the same level as that of the comparing bar, is made to slide along. This slider (*Schieber*) which serves to test the accuracy of the divisions on the comparing bar, has upon its silver slip two lines 1 decimetre apart. This length is divided into halves and each half into 5 centimetres; the first centimetre is again divided into millimetres and the first millimetre into tenths. The motion of this slider in its groove is regulated by means of strings fastened to its ends and pulled from the ends of the comparing bar.

The millimetres on the comparing bar are marked from 0 in the middle to 550 right and left, and the value of each millimetre having been separately and accurately ascertained, the true metric length from 500 R to 500 L was verified from the standard brass metre and found to be at 0° C.=1·00000003 metre. By further observations, the true length from 450 R to 450 L was found = to 0·900000503 metre.

Finally the new Swiss standard of length was verified by comparison with the length from 450 R to 450 L, and found at 0° = 0·8998605 metre. The co-efficient of linear expansion of the new standard bar for 1° C. was found = 0·00000175551. The new standard consequently shows the true length of 0·9 metre or three Swiss feet at the temperature of 0·833 C.

Verification of new Swiss Standard of length.

Two copies of this new Swiss standard were constructed at the same time and were similarly verified, viz.:—

Its two copies.

	Length at 0°C.	Co-efficient of Linear Expansion.	True length of 0·9 metre or 3 Swiss Feet at Temperature of
	Metres.		
Copy No. 1.	0·89997307	0·00000173269	1°·727 C.
„ 2.	0·89998701	0·00000173336	0·833

The Swiss foot is thus equivalent to 0·3 metre (or 0·984 English foot) and—
the foot is divided into 10 inches (pouces)
the inch „ 10 lines (lignes)
the line „ 10 cuts (traits)
the Swiss inch is consequently equivalent to 0·03 metre or 1·18 English inch.

Decimal parts of Swiss standard foot.

Standards Office,
3 April 1869.

H. W. Chisholm,
Warden.

APPENDIX VI.

On the Relation of the Kilogram, the Unit of Metric Weight, and of the Litre, the Unit of Metric Capacity, to the Metre, the Unit and fundamental Base of the Metric System.

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Introduction.

In the following paper it is proposed to consider how far the actual weight of the kilogram corresponds with its theoretical weight in relation to the metre, and what practical advantage results from the establishment of a simple and definite ratio between the units of length and weight, in a system of weights and measures. The actual capacity of the litre, as compared with its theoretical capacity, in relation to the metre, will also be considered, and the result, as affecting the existing legal Imperial equivalent of the litre. Some observations upon the subject have already been made in Appendix II., pp. 23 and 29.

Definition of kilogram.

The kilogram is defined to be the weight in a vacuum of a cubic decimetre of distilled water at its maximum density.

Mode of original determination in 1795.

Base du Syst. Metr., vol. iii. p. 566.

In the original determination of the weight thus defined, and of the true weight of a kilogram, by M. Lefèvre Gineau, in 1795, he had to decide between two modes of proceeding for accurately determining the specified volume of water to be weighed. The first, by measuring the internal capacity of a vessel to contain this volume of water; the second, by measuring externally a solid or hollow body, in order to ascertain the weight of the volume of water displaced by it. He chose the second mode, considering that the accurate external measurement of a metallic body was much less difficult than that of the internal capacity of a metallic vessel.

The form of a cylinder was preferred, as capable of being made and measured with the greatest precision. This was to be made of brass, and hollow, being only so much heavier than the same bulk of water as to enable it to sink by its own weight, when plunged in water. It was not considered requisite that the cylinder should be of the specified volume of a cubic decimetre, but only of the most convenient size for arriving at the desired result. The cylinder actually constructed was intended to be about 2·435 decimetres in diameter, and its height to be equal to the diameter. The mean height was subsequently determined to be 2·437672 decimetres, and the mean diameter 2·428368 decimetres (about 9½ inches), at the temperature of 17°·6 C.

The coefficient of expansion of brass was taken to be 0·0000099, and the volume of the cylinder was computed accordingly, when at the temperature of melting ice, and determined to be nearly 11·28 cubic decimetres (or 688·385 cubic inches).

The weights used were specially constructed for the purpose, and consisted of a unit or provisional kilogram, as nearly as possible of the estimated weight of a cubic decimetre of water, and 11 exact copies, with smaller weights in decimal subdivision, down to the millionth, all carefully verified and deemed less than half of one-millionth part in error.

The mean weight of the cylinder in ordinary air was taken, no reduction to a vacuum being deemed requisite, as the weights used were of similar metal to the cylinder, the interior of which communicated with the external air.

Its weight in air was found to be, in terms of the unit employed	11·4660055
Its mean weight in distilled water, after deducting the weight of air in the cylinder, and of the air displaced by the weights used	0·1967668
Hence the weight of the volume of distilled water equal to the volume of the cylinder	11·2692387

The temperature of the maximum density of water was taken to be 4° C., and by accurate comparison of the above stated weight with the standard weights of the old system, the weight in a vacuum of a cubic decimetre of distilled water at its maximum density, or of the true kilogram, was determined to be 18827·15 grains of the old standard, the *Poids de Marc.*

Standard Metric weight established.

The weight of a kilogram thus ascertained was, and is still, represented by the platinum kilogramme des archives, as the primary and scientific standard of Metric weight, and by the brass kilogramme de l'Observatoire, as the commercial standard. The weights of these two standards were considered to be exactly equal in a vacuum. In air ($t.$ = 65°·66 F., $b.$ = 29·75 in.), the platinum kilogram displaces 58·3 milligrams (0·89981 grains), and the brass kilogram 149·3^{mgr} (2·30493 gr.). The brass commercial kilogram therefore weighs in air 91·^{mgr} (1·40512 gr.) less than the platinum primary standard.

The weight of the standard kilogram, in terms of the Imperial standard, has been ascertained by Professor Miller to be 15432·34874 English grains.

No reverification since made or permitted.

No reverification of the actual weight of the standard kilogram, in relation to its theoretical weight, appears ever to have been made, or even permitted, in France, where the kilogramme des archives has been legally and definitely established as the primary standard and unit of weight.

Actual weight of standard kilogram based on Imperial equivalent.

Professor Miller has furnished me with an important computation of the actual weight of a cubic decimetre of water at its maximum density in terms of the standard kilogramme des archives, the computation being based upon Kupffer's observations of the weight of a cubic inch of water and of the standard kilogram. The details and results of these observations by Kupffer are very fully stated in the second volume of his work, "*Travaux de la Commission pour fixer les mesures et les poids de l'Empire de Russie,*" published in 1841, and they fill no less than 335 pages 4to.

Kupffer's observations of weight of cubic inch of water.

The mode of determination adopted by Kupffer, was first to determine the volume of a hollow brass cylinder, and then to ascertain the loss of the weight in air when the cylinder was immersed in water, this loss being equal to the weight of the volume of water displaced by the immersion of the cylinder.

A brass cylinder, about 0·8 decimetre (or 3·19 inches) in diameter and height, was most carefully measured by means of a microscopical apparatus, and of a Metric scale of brass, divided into quarters of millimetres. For weighing, Russian standard weights were used. The volume of the cylinder was found to be 0·39596574 cubic decimetre, or 24·17753 cubic inches, whence the weight in a vacuum of a cubic inch of distilled water 368·380 doli.

In order to verify this result, he repeated the operation with a second and somewhat larger brass cylinder, 4 inches in diameter and height. The measurement was made with a brass scale divided into hundredths of an inch, the scale having been verified with Kater's standard yard.

On comparing the two scales he found

1 millimetre = 0·03937783 inch.

No allowance appears to have been made by him for the difference between the standard temperature of the French and English standards of length.

The volume of the larger cylinder was found to be 49·89931 cubic inches, whence the weight in a vacuum of a cubic inch of distilled water 368·341 doli. The water used was twice distilled.

From the mean of these two results Kupffer accordingly found that a cubic inch (English) of pure water at 13⅓° Reaumur (62° Fahr., or 16⅔ Cent.) weighed in a vacuum = 368·361 doli; he also found (p. 414) the French kilogramme = 22504·859 doli.*

According to Kater's measurement, the decimetre = 3·937079 cubic inches.

And from the table of logarithms of the ratios of the maximum density of water to its density at 1° C., in Professor Miller's paper on the construction of the standard pound (Phil. Trans. 1856, p. 791), log. ratio of densities of water at 16⅔ C. = 0·0004853.

On the authority of Playfair and Joule, water is taken to be at its maximum density at the temperature of 3°·945 C.

From these data it appears that a cubic decimetre of water at 16⅔° C. weighs in a vacuum,

$$(3\cdot937079)^3\ 368\cdot361 \text{ doli},$$

or

$$(3\cdot937079)^3\ \frac{368\cdot361}{22\cdot504859} \text{ grams};$$

and that a cubic decimetre of water at its maximum density weighs

$$(3\cdot937079)^3\ \frac{368\cdot361}{22\cdot504859}\ \frac{\text{max. dens. of water}}{\text{dens. water at } 16\frac{2}{3}^\circ \text{ C.}} \text{ grams.}$$

which when worked out is as follows:

log. $(3\cdot937079)^3$	1·7855223
log. 368·361	2·5662737
log. (ratio of densities of water at 16⅔° C.)	0·0004853
	4·3522813
log. 22·504859	1·3522763
∴ log. 1000·0115	3·0000050

Therefore, according to this computation, based upon Kater's valuation of the metre, a cubic decimetre of water at its maximum density weighs 1000·0115 grams; and therefore 11·5 milligrams, or 0·17747 grains more than a kilogram.

By a similar computation, if Capt. Clarke's more recent valuation of the metre = 39·370432 English inches be taken as the base, a cubic decimetre of water at its maximum density weighs 15 milligrams, or ·23145 grain *less* than a kilogram.

If the mean of these two computations be taken, the weight of a cubic decimetre of water at its maximum density will be only 1·75 milligram, or ·027 grain less than a kilogram.

These figures and computations of Professor Miller have been carefully verified by me. Kupffer's operations for determining the weight of a cubic inch of water appear to have been made with the greatest possible care and accuracy.

* Kupffer found (p. 405) 8399·742 doli = standard Troy pound, whence
1 dola = 0·67853 grains.
1 grain = 1·45829 doli.
368·361 doli = 252·598 grains.
22504·859doli = 15432·36186 grains.

At the conclusion of his work, Kupffer refers to other computations of the weight of a cubic inch of water, viz., Other computations of weight of cubic inch of water.

By Lefèvre Gineau, in 1795*	= 368·365 doli
„ Shuckburgh and Kater, in 1797 and 1821†	= 368·542 „
„ Berzelius, Svanberg, and Akermann, in 1825	= 368·474 „
„ Stampfer	= 368·237 „

In page 145 of Dr. Wild's recently published work upon the Swiss Standards, mentioned in Appendix V., he refers to the weight of a cubic decimetre of distilled water at 4° C., as derived from the five beofrementioned observations, and gives the following table of the results as computed by him:—

Country.	Observers.	Weight of 1 cubic decimetre of distilled water at 4° C.
		grammes.
France	Lefevre-Gineau	1000·000
England	Shuckburgh and Kater	1000·480
Sweden	Berzelius, Svanberg, and Akermann	1000·296
Austria	Stampfer	999·653
Russia	Kupffer	999·989
	Mean	1000·084

The stated computation of Lefèvre Gineau is derived from that upon which the weight of the kilogram was originally determined at Paris, and the difference of this computation and Kupffer's corresponds with the difference in the actual and theoretical weight of the kilogram, as shown above.

The observations at Stockholm in 1825 were made with a cylinder 4 inches diameter and 6 inches high, Swedish weights and measures being used. Those of Stampfer at Vienna, with Austrian weights and measures. Their results are given by Kupffer in equivalent doli.

The difference between Kupffer's computation and that of Shuckburgh and Kater is more material. The equivalent of 368·542 doli is 252·722 grains, the weight in a vacuum of a cubic inch of pure water at 62° Fahr., as determined by Sir George Shuckburgh in 1797, and corrected in terms of the standard yard and pound deposited at the House of Commons, these having been subsequently legalised as the Imperial standards by the Act 5 Geo. 4, c. 74. Shuckburgh's determination was confirmed by Kater in 1821. Shuckburgh's and Kater's determination, in 1797 and 1821.

The mode of determination adopted by Shuckburgh and Kater was the same as that used by both Lefèvre Gineau and Kupffer, from the weight of water displaced by a metallic body, the dimensions of which had been accurately found.

For this purpose, the same metallic bodies were used by both Shuckburgh and Kater; they were constructed by Troughton, viz.:

A solid cube of brass, whose sides were 5 inches.

A solid brass cylinder, 4 inches in diameter and 6 high.

A hollow sphere of brass, 6 inches in diameter.

The cubical contents in inches at 62° Fahr. were found to be as follows:—

—	Shuckburgh.	Kater.
Cube	124·18917	124·1969
Cylinder	74·9823	75·2398
Sphere	113·5194	113·5264

Only the microscopical measurement of these cubical bodies was repeated by Kater; he accepted

* Bas du Syst. Metr. vol. 3, p. 570.
† Phil. Trans. 1798 and 1821, part 2.

the weighing observations of Shuckburgh without reverifying them.

The Shuckburgh scale of length was used, having been found by Kater to be identical with the parliamentary standard. The weights used by Sir G. Shuckburgh were expressly made for him, and were subsequently corrected by the parliamentary standard. He used 3 gallons of distilled water supplied from St. George's Hospital. After the weighings were completed, he tested the distilled water with Martin's hydrometer, and could "see no reason for diffidence in the quality of the water." But such a test is of little worth.

The weight of a cubic inch of distilled water in a vacuum at 62° was accordingly found to be,

Deduced from the cube 252·907 of Sir G. Shuckburgh's grains.

„	cylinder	252·851	„ „
„	sphere	252·907	„ „
	mean	252·888	„ „

equal to 252·722 grains of the parliamentary standard.

Since legalized by Acts of 1824 and 1859.

This weight of the cubic inch of water is recited in the third report of the Standards Commission of 1823. It was also the base for determining the weight of a cubic inch of water, as stated in the Act 5 Geo. 4, c. 74, which was founded upon the report of 1823, viz., the equivalent weight of 252·458 grains when weighed *in air* by brass weights, at the temperature of 62° Fahrenheit, the barometer being at 30 inches. From the same base the bulk of the Imperial gallon is stated, in S. 14, to be equal to 277·274 cubic inches. The weight in air of the cubic foot of water at 62° Fahrenheit, recited as 62·321 lbs. in the Sale of Gas Act, 1859, and constituted the base of our gas-measuring standards, is also taken from the table appended to the report of 1823 (there stated as 62·3206 lbs.), and is derived from Shuckburgh and Kater's determination of the weight of a cubic inch of water.

Indeed, if Kupffer's computation of the weight of a cubic inch of water when weighed in air by brass weights, as expressed in Imperial equivalents, (viz., not 252·458¼ grains but 252·334 grains,) be correct, it would make the true weight of the cubic foot of water, not 62·321 lbs. but 62·2904 lbs., being less than the present legal weight by 0·0306 lb. or 214·2 grains; and the gallon would equal in bulk, not 277·274 but 277·399 cubic inches. But, in point of fact, the authority of a computation based upon the Imperial weights and measures used by Kupffer cannot be put in comparison with that based on the Imperial standards used by Shuckburgh and Kater. It may therefore be stated that the legal weight in a vacuum of the cubic inch of water at 62° Fahrenheit, thus scientifically and authoritatively determined by Shuckburgh and Kater, is 252·722 gr.

Computation of kilogram based on this determination.

The legal equivalent of the metre, according to the Metric Act of 1864, being 39·37079 inches, and the French standard kilogramme des archives having been determined by Professor Miller to weigh in a vacuum 15432·34874 English grains, it would appear from these data that a cubic decimetre of pure water at its maximum density weighs in a vacuum,

$$(3\cdot937079)^3 \frac{252\cdot722}{15\cdot43234874}$$

maxm. dens. of water / dens. of water at $16\frac{2}{3}^{0}$ C. grams,

viz.,

log. $(3\cdot937079)^3$ - - -	1·7855223
log. 252·722 - - -	2·4026430
log. (ratio maxm. dens. of water at $16\frac{2}{3}$ C.) - - -	0·0004853
	4·1886506
log. 15·43234874 - -	1·1884321
∴ log. 1000·503 - - -	3·0002185

being 1000·503 grams = 15437·76129 grains.

The French kilogram having been determined by Kupffer, as already stated, to be equal to 22504·859 doli, or 15432·36186 English grains, the weight of the cubic decimetre of water computed from his equivalent of 252·722 grains, or 368·542 doli, the weight of a cubic inch of water will not differ appreciably, or up to the fifth decimal figure, from the last-mentioned result. Thus—

log. $(3\cdot937079)^3$ - - -	1·7855223
log. 368·542 - - -	2·5664870
log. (ratio maxm. dens. of water at $16\frac{2}{3}$ C.) - - -	0·0004853
	4·3524946
log. 22·504859 - - -	1·3522762
∴ log. 1000·503 - - -	3·0002184

Its result

Thus, if the existing legal weight of the cubic inch of water be taken as the base of the computation, *the standard kilogram is* 503 *milligrams, or* 7·76247 *grains, in excess of its theoretical weight.*

As the commercial standard kilogram displaces in air 149·3 milligrams (2·30493 grains), its actual weight in air would thus appear to be in excess of its theoretical weight 353·7 milligrams (5·45754 grs.).

Shuckburgh's & Kater's determination, now accepted in France;

The weight of a cubic inch of water, as determined by Shuckburgh and Kater, as well as Kater's equivalent of the metre in British inches, are both accepted in France, and stated in the official and scientific periodical, the *Annuaire du Bureau des Longitudes*, as well as the corresponding cubic measurement of an Imperial gallon, derived from the relation of the weight of a gallon of water to that of a cubic inch of water.

and form the base of the legal Imperial equivalent of the litre;

In fact, these determinations form the base of the equivalent of the litre in terms of the Imperial gallon, and of the consequent equivalent values of the other Metric and Imperial measures of capacity, also stated in the *Annuaire du Bureau des Longitudes*, and which have been adopted as legal equivalents in this country by the schedule annexed to the Metric Act, 1864.

The Imperial equivalent of the litre is stated to have been derived as follows:—

Ann. re. p. 108.

1. From the weight in a vacuum of a cubic inch of distilled water at 62° Fahr. = 252·458 grains.
2. The cubic measurement of the Imperial gallon, containing 70,000 grains weight of distilled water = 277·273844 cubic inches.
3. The Metric equivalent of the cubic inch = 16·386176 cubic centimetres.
4. The consequent Metric equivalent of the cubic measurement of the Imperial gallon = 4543·4579 cubic centimetres, or 4·5434579 cubic decimetres.
5. The *theoretical* capacity of the litre = a cubic decimetre.

Whence an Imperial gallon = 4·5434579 litres, and consequently a litre = 0·2200967 gallon.

Whilst the legal Imperial equivalent of the metre and kilogram have been *practically* determined by means of actual comparisons of the material standards by Kater and by Professor Miller, the legal Imperial equivalent of the litre and of the Metric measure of capacity is thus based upon the bulk of the gallon, computed from the determination of the weight of the cubic inch, as compared with the *theoretical* capacity of the litre.

Differences of actual & theoretical capacity of litre.

But the litre of the Metric system which is practically in use is derived not from its theoretical cubic measurement but from the actual weight of the kilogram; it follows, therefore, that the actual capacity of the litre differs from its theoretical capacity by as much as the actual weight of the kilogram differs from its theoretical weight. It follows also, that the legal equivalent of the litre differs in the same proportion from the actual equivalent, assuming the cubical contents of the gallon, both in Imperial and Metric measures as above stated, to have been accurately determined.

Actual & legal equivalents.

It will be observed that in this computation of the Metric equivalent of the Imperial gallon, no allowance is made for the difference of the standard temperature of the water in the measures of the two countries; the temperature of the water in the gallon being taken at 62° Fahr. (or 16⅔ Cent.), and that of the litre at 4° C. According to the authorized French table of corrections (see Appendix II. p. 8), the weight of a litre of water at 16⅔ C. = 999·012 grams.

A simpler and more accurate mode of computing the actual Imperial equivalent of the litre may be found from the relation between the weight of water at 62° Fahr. contained in the Imperial gallon = 10 lbs., and in the litre = 999·012 grams., or 2·202443 lbs. Whence the Imperial gallon = 4·54041245 litres, and the litre = 0·2202443 gallon.

The practical advantage of a direct and simple ratio between the unit of weight and the unit of length, in a system of weights and measures, has been stated to consist in the facility which it affords for calculating the weight of bulky commodities from their cubic measurement.

The weight of a given cubic measure of water being known, and the specific gravity of the commodity to be weighed, the weight of all such commodities as a stack of hay, a boatload of coal, the contents of a malt-house, a quantity of brickwork, &c., as well as the tonnage of ships, may readily be found with approximate accuracy, by multiplying the cubic measurement by the specific gravity.

In this respect the Metric system, in which the scientific weight of a cubic decimetre of water is exactly a kilogram, and of a cubic metre of water 1,000 kilograms, or a ton, appears to have an advantage over the Imperial system, in which the scientific weight of a cubic inch of water is 252·722 grains, of a cubic foot of water 62·3862 lbs., and a cubic yard of water 1684·4274 lbs., or 15·0395 cwt., or 0·7519 tons, so far as these decimal figures extend.

But in practical operations, the difficulty in the Imperial system is to a great extent got rid of by taking the cubic foot of water at the approximate weight of 1,000 ozs. Its legal weight in ordinary air being 997·136 ounces, the result will evidently be 0·2864 per cent. in excess. The weight *in avoirdupois ounces* is thus found approximatively with as much facility as in the Metric system, though not quite so accurately.

This may be illustrated by the following examples:

Required the weight of a block of stone, the dimensions of which, in Imperial measure, are 9 feet by 6, and 3 feet high; and, in Metric measure, 3 metres by 1·8, and 0·9 metre high, the specific gravity of the stone being 2·5?

Imperial system.

9 × 6 × 3 feet

6

54

3

162 cubic feet.

2·5

810

324

405·0

1000

4)405000 ounces.

4)101250

4)25312·5 lbs.

4)6328·125

7)1582·03125

2,0)22,6·00446 cwts.

Weight = 11 tons 6 cwt.

(Error 0·2864 per cent. in excess.)

Metric system.

3 × 1·8 × 0·9 metres

1·8

5·4

0·9

4·86 cubic metres.

2·5

2430

972

12·150 cubic metres.

Weight = 12·15 French tons, or 12 tons and 150 kilograms.

(Error 0·03537 per cent. in excess, according to the previous computation.)

Real advantage to Metric system in its decimal scale.

In thus estimating the weight of commodities from their cubic measurement, it is obvious that the chief advantage afforded by the Metric system is derived, not from the direct ratio of the unit of weight to that of length, but from the decimal scale of the Metric system, by which any amount of weight can be expressed in a single denomination, or in any other denomination by merely changing the decimal point; whilst the weight in ounces of the Imperial system must be raised by a series of divisions to the higher denominations of pounds, hundredweights, and tons.

H. W. Chisholm,
Warden of the Standards.

Standards Department,
April 3, 1869.

APPENDIX VII.

Tables of Decimal Equivalents of Imperial and Metric Weights and Measures.

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Note.—These equivalents are based upon the following Imperial equivalents of the Metric units :—
The Metre = 39·37079 inches, as determined by Capt. Kater, in 1818.
The Kilogram = 15,432·34874 grains, as determined by Professor Miller, in 1844.
The Litre = 0·2202443 gallon, as now determined from comparing the weight of distilled water contained in the litre with that in the Imperial gallon.

I. Measures of Length.

Metric Denominations and Values.	Equivalents in Imperial Denominations.			
	Metres.	Miles.	Yards.	Feet.	Inches.
Millimetre - -	$\frac{1}{1000}$	—	—	—	= 0·03937
Centimetre - -	$\frac{1}{100}$	—	—	—	= 0·39370
Decimetre - -	$\frac{1}{10}$	—	—	—	= 3·93708
Metre - - -	1	—	= 1·09363	= 3·28089	=39·37079
Dekametre - -	10	—	= 10·93633	= 32·80899	—
Hectometre - -	100	—	= 109·36330	—	—
Kilometre - -	1,000	= 0·62138	= 1,093·63305	—	—
Myriametre - -	10,000	= 6·21382	= 10,936·33055	—	—

Imperial Denominations.	Equivalents in Metric Denominations.			
	Millimetre.	Decimetre.	Metre.	Kilometre.
Inch - - - -	= 25·39954	—	—	—
Foot or 12 inches -	—	= 3·04794	= 0·30479	—
Yard or 3 feet or 36 inches -	—	—	= 0·91438	—
Fathom or 2 yards or 6 feet -	—	—	= 1·82876	—
Pole or 5½ yards - -	—	—	= 5·02911	—
Chain or 4 poles or 22 yards -	—	—	= 20·11643	—
Furlong, 40 poles, or 220 yards -	—	—	= 201·16436	= 0·20116
Mile, 8 furlongs, or 1,760 yards -	—	—	= 1,609·31492	= 1·60931

Multiples of Equivalent Units of Imperial and Metric Measures of Length.

	Imperial to Metric.				Metric to Imperial.			
	Inches to Millimetres.	Feet to Metres.	Yards to Metres.	Miles to Kilometers.	Centimetres to Inches.	Metres to Feet.	Metres to Yards.	Kilometres to Miles.
1	25·39954	0·30479	0·91438348	1·60931	0·393708	3·28089	1·09363305	0·62138
2	50·79908	0·60958	1·82876696	3·21863	0·787416	6·56179	2·18726610	1·24276
3	76·19862	0·91438	2·74315044	4·82794	1·181124	9·84269	3·28089915	1·86414
4	101·59816	1·21917	3·65753392	6·43726	1·574832	13·12359	4·37453220	2·48553
5	126·99770	1·52397	4·57191740	8·04657	1·968539	16·40449	5·46816525	3·10691
6	152·39724	1·82876	5·48630088	9·65589	2·362247	19·68539	6·56179830	3·72829
7	177·79679	2·13356	6·40068436	11·26520	2·755955	22·96629	7·65543135	4·34967
8	203·19633	2·43835	7·31506784	12·87452	3·149664	26·24719	8·74906440	4·97106
9	228·59587	2·74315	8·22945132	14·48383	3·543371	29·52809	9·84269745	5·59244
10	253·99541	3·04794	9·14383480	16·09315	3·937079	32·80899	10·93633050	6·21382

II. Square Measures or Measures of Surface.

Metric = Imperial Square Measures.

1 square decimetre - - - = 15·50059 square inches.
1 square metre or 100 square decimetres = 10·76430 square feet or 1·19603 square yards.
Are or 100 square metres - - = 119·60332 square yards.
Hectare or 100 ares or 10,000 sq. metres - = 11,960·33260 square yards or 2·47114 acres or 2 acres and 2,280·33260 square yards.

Imperial = Metric Square Measures.

Imperial Measures.	Square Decimetres.	Square Metres.	Ares.	Hectares.
1 square inch - - -	= 0·06451	—	—	—
1 square foot or 144 square inches	= 9·28996	= 0·092899	—	—
1 square yard, or 9 square feet, or 1,296 square inches.	=83·60971	= 0·836097	—	—
1 perch or rod, or 30¼ square yards.	—	=25·291939	—	—
1 rood, or 40 perches, or 1,210 square yards.	—	—	=10·116775	—
1 Acre, or 4 roods, or 4,840 square yards.	—	—	—	= 0·40467
1 square mile or 640 acres -	—	—	—	=258·98944

Multiples of Equivalent Units of Imperial and Metric Square Measures.

—	Imperial to Metric.				Metric to Imperial.			
	Square Inches to Square Centimetres.	Square Feet to Square Decimetres.	Square Yards to Square Metres.	Acres to Hectares.	Square Decimetres to Square Inches.	Square Metres to Square Feet.	Square Metres to Square Yards.	Hectares to Acres.
1	6·45136	9·289968	0·836097	0·40467	15·50059	10·764299	1·196033	2·47114
2	12·90273	18·579936	1·672194	0·80934	31·00118	21·528598	2·392066	4·94228
3	19·35410	27·869904	2·508291	1·21401	46·50177	32·292898	3·588099	7·41342
4	25·80546	37·159872	3·344388	1·61868	62·00236	43·057197	4·784133	9·88457
5	32·25683	46·449840	4·180485	2·02335	77·50295	53·821496	5·980166	12·35571
6	38·70819	55·739808	5·016582	2·42802	93·00354	64·585796	7·176199	14·82685
7	45·15956	65·029776	5·852680	2·83269	108·50413	75·350095	8·372232	17·29800
8	51·61033	74·319744	6·688777	3·23736	124·00472	86·114394	9·568266	19·76914
9	58·06230	83·609712	7·524874	3·64203	139·50531	96·878694	10·764299	22·24028
10	64·51366	92·899680	8·360971	4·04671	155·00591	107·642993	11·960332	24·71143

III. Equivalent Units and their Multiples of Imperial and Metric Cubic Measures.

—	Imperial to Metric.			Metric to Imperial.		
	Cubic Inch to Cubic Centimetre.	Cubic Feet to Cubic Decimetres.	Cubic Yards to Cubic Metres.	Cubic Decimeters to Cubic Inches.	Cubic Metres to Cubic Feet.	Cubic Metres to Cubic Yards.
1	16·38618	28·31531	0·76451	61·02705	35·31658	1·30802
2	32·77236	56·63062	1·52902	122·05410	70·63316	2·61604
3	49·16854	84·94593	2·29354	183·08115	105·94974	3·92406
4	65·54472	113·26124	3·05805	244·10820	141·26632	5·23208
5	81·93090	141·57655	3·82256	305·13525	176·58290	6·54010
6	98·31708	169·89187	4·58708	366·16230	211·89948	7·84812
7	14·70326	198·20718	5·35159	427·18936	247·21606	9·15615
8	131·08944	226·52249	6·11610	488·21641	282·53264	10·46417
9	147·47562	254·83780	6·88062	549·24346	317·84922	11·77219
10	163·86180	283·15311	7·64513	610·27051	353·16580	13·08021

IV. Measures of Capacity.

Metric Denominations and Values.		Equivalents in Imperial Denominations.					
——	Litre.	Gills.	Pints.	Quarts.	Gallons.	Bushels.	Quarters.
Centilitre -	$\frac{1}{100}$	=0·07047	=0·01762	—	—	—	—
Decilitre -	$\frac{1}{10}$	=0·70477	=0·17619	—	—	—	—
Litre - -	1	—	=1·76195	=0·88097	= 0·22024	—	—
Dekalitre -	10	—	—	—	= 2·20244	=0·27530	—
Hectolitre -	100	—	—	—	=22·02443	=2·75305	=0·34413
Kilolitre -	1,000	—	—	—	—	—	=3·44131

IV. Measures of Capacity—continued.

Imperial Denominations.	Equivalents in Metric Denominations.			
	Decilitres.	Litres.	Dekalitres.	Hectolitres.
1 gill	=1·41887	=0·14188	—	—
1 pint or 4 gills	=5·67551	=0·56755	—	—
1 quart or 2 pints	—	=1·13510	—	—
1 Gallon or 4 quarts	—	=4·54041	—	—
1 peck or 2 gallons	—	=9·08082	=0·90808	—
1 bushel or 8 gallons	—	—	=3·63233	—
1 quarter or 8 bushels	—	—	—	=2·90586

Multiples of Equivalent Units of Imperial and Metric Measures of Capacity.

—	Imperial to Metric.				
	Pints to Litres.	Quarts to Litres.	Gallons to Litres.	Bushels to Dekalitres.	Quarters to Hectolitres.
1	0·56755	1·13510	4·54041245	3·63233	2·90586
2	1·13510	2·27020	9·08082490	7·26466	5·81172
3	1·70265	3·40530	13·62123735	10·89699	8·71759
4	2·27020	4·54041	18·16164980	14·52932	11·62345
5	2·83775	5·67551	22·70206225	18·16165	14·52931
6	3·40530	6·81061	27·24247470	21·79398	17·43518
7	3·97286	7·94572	31·78288715	25·42631	20·34104
8	4·54041	9·08082	36·32329960	29·05864	23·24691
9	5·10796	10·21592	40·86371205	32·69097	26·15277
10	5·67551	11·35103	45·40412450	36·32330	29·05863

—	Metric to Imperial.				
	Litres to Pints.	Litres to Quarts.	Litres to Gallons.	Dekalitres to Bushels.	Hectolitres to Quarters.
1	1·76195	0·88097	0·2202443	0·27530	0·34413
2	3·52390	1·76195	0·4404886	0·55061	0·68826
3	5·28586	2·64293	0·6607329	0·82591	1·03239
4	7·04781	3·52390	0·8809772	1·10122	1·37652
5	8·80977	4·40488	1·1012215	1·37652	1·72065
6	10·57172	5·28586	1·3214658	1·65183	2·06479
7	12·33367	6·16683	1·5417101	1·92713	2·40892
8	14·09563	7·04781	1·7619544	2·20244	3·75305
9	15·85758	7·92879	1·9821987	2·47774	3·09718
10	17·61954	8·80977	2·2024430	2·75305	3·44131

V. Metric Weights = Imperial Avoirdupois Weights.

1 Kilogram = 2 lb. 3 oz. 4 drams 10·47374 grains.

Metric Weights.		Grains.	Drams.	Ozs.	Lbs.	Cwts.	Tons.
Milligram or	$\frac{1}{1000}$ gram	= 0·01543	—	—	—	—	—
Centigram or	$\frac{1}{100}$ „	= 0·15432	—	—	—	—	—
Decigram or	$\frac{1}{10}$ „	= 1·54323	—	—	—	—	—
Gram or	1 „	= 15·43234	= 0·56438	—	—	—	—
Dekagram or	10 grams	= 154·32348	= 5·64383	= 0·35273	—	—	—
Hectogram or	100 „	= 1543·23487	= 56·43830	= 3·52739	—	—	—
Kilogram or	1,000 „	=15432·34874	=564·38304	=35·27394	= 2·20462	—	—
Myriagram or	10,000 „	—	—	—	= 22·04621	—	—
Quintal or	100,000 „	—	—	—	= 220·46212	= 1·96841	—
Millier or ton or	1,000,000 „	—	—	—	=2204·62125	=19·68411	=0·9842

Imperial Avoirdupois = Metric Weights.

Imperial Avoirdupois Weights.	Grams.	Decigrams.	Kilograms.	Millier or Metric Ton.
1 dram - - -	= 1·77184	—	—	—
1 ounce or 16 drams -	= 28·34954	= 2·83495	—	—
1 Pound or 16 ounces or 256 drams - -	= 453·59265	= 45·35926	= 0·45359	—
1 hundredweight or 112 lbs.	—	—	= 50·80237	—
1 ton or 20 cwt. - -	—	—	= 1016·04754	= 1·01604

Multiples of Equivalent Units of Imperial Avoirdupois and Metric Weights.

—	Imperial Avoirdupois to Metric.				Metric to Imperial Avoirdupois.			
	Drams to Grams.	Ounces to Grams.	Pounds to Kilograms.	Tons to Milliers.	Grams to Drams.	Hectograms to Ounces.	Kilograms to Pounds.	Milliers to Tons.
1	1·77184	28·34954	0·4535926525	1·01604	0·56438	3·52739	2·20462125	0·98420
2	3·54369	56·69908	0·9071853050	2·03209	1·12876	7·05478	4·40924250	1·96841
3	5·31553	85·04862	1·3607779575	3·04814	1·69314	10·58218	6·61386375	2·95261
4	7·08738	113·39816	1·8143706100	4·06419	2·25753	14·10957	8·81848500	3·93682
5	8·85923	141·74770	2·2679632625	5·08023	2·82191	17·63697	11·02310625	4·92102
6	10·63107	170·09724	2·7215559150	6·09626	3·38629	21·16436	13·22772750	5·90523
7	12·40292	198·44678	3·1751485675	7·11233	3·95068	24·69175	15·43234875	6·88944
8	14·17477	226·79632	3·6287412200	8·12838	4·51506	28·21915	17·63697000	7·87364
9	15·94661	255·14586	4·0823338725	9·14442	5·07944	31·74655	19·84159125	8·85785
10	17·71846	283·49540	4·5359265250	10·16047	5·64383	35·27394	22·0462125	9·84205

VI. Metric Weights = Imperial Troy Weights.

Kilogram = 2 Troy lbs. 8 oz. 3 dwt. ·34874 grains.

Metric Weights.	Troy lb.	Oz.	Dwt.	Grains.
Kilogram - -	2·67922	= 32·150726	—	= 15432·34874
Hectogram - -	—	= 3·21507	= 6·430145	= 1543·23487
Dekagram - -	—	= 0·32150	= 0·64301	= 154·32348
Gram - - -	—	—	—	= 15·43234
Decigram - -	—	—	—	= 1·54323
Centigram - -	—	—	—	= 0·15432
Milligram - -	—	—	—	= 0·01543

Imperial Troy = Metric Weights.

Imperial Troy Weights.	Kilogram.	Hectogram.	Dekagram.	Gram.	Decigram.	Milligram.
Troy lb. or 5,760 grains	=0·37324	= 3·73242	= 37·32419	= 373·24195	—	—
„ oz. or 480 „ -	—	—	= 3·11035	= 31·10349	—	—
„ dwt. or 24 „ -	—	—	—	= 1·55517	—	—
„ grain 1 „ -	—	—	—	= 0·064799	=0·64799	= 64·79895

Multiples of Equivalent Units of Imperial, Troy, and Metric Weight.

—	Imperial Troy to Metric.				Metric to Imperial Troy.			
	Grains to Milligrams.	Dwts. to Grams.	Ounces to Grams.	Pounds to Kilograms.	Grams to Grains.	Grams to Dwts.	Hectograms to Ounces.	Kilograms to Pounds.
1	64·79895	1·5551748	31·103496	0·37324	15·43234874	0·64301	3·21507	2·679227
2	129·59790	3·1103496	62·206992	0·74648	30·86469748	1·28602	6·43014	5·358454
3	194·39685	4·6655244	93·310488	1·11972	46·29704622	1·92904	9·64521	8·037681
4	259·19580	6·2206992	124·413984	1·49296	61·72939496	2·57205	12·86028	10·716908
5	323·99475	7·7758740	155·517480	1·86620	77·16174370	3·21507	16·07536	13·396136
6	388·79370	9·3310488	186·620976	2·23945	92·59409244	3·85808	19·29043	16·075363
7	453·59265	10·8862236	217·724472	2·61269	108·02644118	4·50110	22·50550	18·754590
8	518·39160	12·4413984	248·827968	2·98593	123·45878992	5·14411	25·72057	21·433817
9	583·19055	13·9965732	279·931464	3·35917	138·89113866	5·78713	28·93564	24·113044
10	647·98950	15·551748	311·034960	3·73241	154·3234874	6·43014	32·15072	26·792272

H. W. Chisholm, Warden.

Standards Department, May 12, 1869.

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PALL MALL

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STANDARDS COMMISSION.

SECOND REPORT

OF

THE COMMISSIONERS

APPOINTED TO INQUIRE INTO

THE CONDITION OF THE EXCHEQUER (NOW BOARD OF TRADE) STANDARDS.

ON THE QUESTION OF THE INTRODUCTION

OF THE

METRIC SYSTEM OF WEIGHTS AND MEASURES

INTO

THE UNITED KINGDOM.

Presented to both Houses of Parliament by Command of Her Majesty.

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FOR HER MAJESTY'S STATIONERY OFFICE.

1869.

THIRTIETH REPORT

ON

PRISONS IN SCOTLAND:

BEING

(IN CONTINUATION OF THE REPORTS OF THE LATE GENERAL BOARD OF PRISONS)

THE EIGHTH ANNUAL REPORT

OF

THE MANAGERS APPOINTED UNDER THE PRISONS (SCOTLAND) ADMINISTRATION ACT.

TO THE RIGHT HONOURABLE HENRY AUSTIN BRUCE,

ONE OF HER MAJESTY'S PRINCIPAL SECRETARIES OF STATE.

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EIGHTH ANNUAL REPORT

OF

THE MANAGERS APPOINTED UNDER THE PRISONS (SCOTLAND) ADMINISTRATION ACT.

TO THE RIGHT HONOURABLE H. A. BRUCE,

One of Her Majesty's Principal Secretaries of State.

11, Melbourne Place,
Edinburgh, 8*th February* 1869.

Sir,

In terms of the provisions of the Prisons (Scotland) Administration Act, we have the honour to lay before you our Eighth Report. We commence as usual with a statement of the statutory directions, in terms of which we are required to prepare our Annual Report :—

Statutory direct for Annual Rep Secretary of St terms of 23 and Vict. c. 105, sec

'The Managers shall, on or before the 15th day of *February* in every year, 'make and transmit to one of Her Majesty's Principal Secretaries of State a full 'Report of their whole proceedings during the year ending on the 31st day of '*December* preceding, and an Abstract of their whole receipts and expenditure, 'classifying the separate articles thereof; and in the said Report, or in the Ap- 'pendix thereto, there shall be set forth all new rules or alterations of rules for 'Prisons which shall have been made by such Secretary of State as aforesaid, any 'orders issued by such Secretary of State constituting a new Prison or altering 'the classes of prisoners for which a Prison is legal, and such information and statistics 'regarding Prisons in *Scotland* as such Secretary of State may require.'

Proceedings as minal Lunatics, terms of 25 and Vict. c. 54, sects 19-24.

In addition to the matters on which we have thus to report under the Prisons Act, we have to give an account of certain proceedings relating to Criminal Lunatics, arising out of the provisions of the Lunacy Act of 1857, as affected by the Act of 1862, 'to make further provision respecting Lunacy in Scotland.'

The Managers.

The Managers consist of the Sheriff of Perth, the Inspector of Prisons for Scotland, and the Crown Agent in Scotland, all *ex officio*, along with one person appointed by Her Majesty to be Stipendiary Manager and Secretary to the Managers. The Crown Agent represents the Government of the day, and the holder of the office is changed with each change of Ministry. Thus, in December, Mr. Thomas Graham Murray was succeeded as Crown Agent by Mr. Charles Morton. To Mr. Murray, while he acted in the department, the public became indebted for able and efficient services, which he could not have rendered without a considerable sacrifice of valuable time.

---

* * * * * *

CUSTODY OF CONVICTS AND MANAGEMENT OF THE GENERAL PRISON.

The General Prison for Scotland at Perth contains a Prison proper, or Penal Department; and an Establishment for the Criminal Lunatics of Scotland, or a Lunatic Department. The purposes to which each of these departments is applicable, continue to be, as they have been set forth in our last and previous Reports, the following :—

'The Penal Department.

The Classes of Prisoners admit to General Pris

'This Department is constituted for the reception of—1*st*, Prisoners sentenced to imprisonment 'by the Courts of Law in Scotland. Such prisoners sentenced to nine months' imprisonment and 'upwards, are removed from Local Prisons to the General Prison, under the statutory powers of the 'Managers, unless the sentence contains a clause specially declaring that the prisoner shall not be 'removed to the General Prison. Prisoners sentenced to shorter periods can be removed to the 'Prison by the Secretary of State under his statutory powers, should an occasion occur for the 'exercise of these powers.

Sentenced to Imprisonment.

cts.

'2*d*, Convicts under sentences of transportation or of penal servitude. These are removed to 'the Prison by order under the hand of the Secretary of State.

'The Lunatic Department.

inal Lunatics.

'This Department is constituted for the reception of—1*st*, Persons who, by judgment of the 'Criminal Courts, have been placed at Her Majesty's disposal on the ground of insanity, either at the 'time when they committed the offence charged against them, or at the time of trial; and

'2*d*, Prisoners who have become insane while undergoing punishment.

d 26 Vict. c. 54, 23.

'By warrant under the hand of the Secretary of State, granted on Medical Certificate, such a 'prisoner may be detained after the expiry of his sentence.'

Prison of Ayr.

A portion of the County Prison of Ayr continues, as elsewhere more fully stated, to be available for Female Convicts.

Referring for more full details to the Appendix, the following Table sets forth the distribution of the accommodation at our disposal, and the manner in which it was occupied throughout the year 1868 :—

GENERAL PRISON.

Penal Department.

I. Accommodation—	Males.	Females.	Both.
Cells,	342	373	715
Average Occupation of Hospitals,	11	14	25
Total,	353	387	740

II. Occupation—	Prisoners Sentenced				Both.
	To Imprisonment.		To Transportation or to Penal Servitude.		
	M.	F.	M.	F.	
At commencement of the year,	273	148	72	204	697
Admitted during the year,	294	142	112	73	621
Total,	567	290	184	277	1318
Disposed of during the year,	300	148	109	59	616
In custody at the end of the year,	267	142	75	218	702
Daily average throughout the year,	265	141	80	203	689

Lunatic Department.

I. Accommodation—	Males.	Females.	Total.
Apartments for	40	18	58

II. Occupation—	Inmates.		
	M.	F.	Both.
At commencement of the year,	31	14	45
Admitted during the year,	7	4	11
Total,	38	18	56
Disposed of during the year,	4	2	6
Inmates at the end of the year,	34	16	50
Daily average throughout the year,	33	15	48

PRISON OF AYR.

PROPORTION AT THE DISPOSAL OF THE SECRETARY OF STATE FOR FEMALE CONVICTS.

Cells,	96
OCCUPATION—	
At the commencement of the year,	85
Admitted during the year,	45
Total,	130
Disposed of during the year,	46
In custody at the end of the year,	84
Daily average throughout the year,	85

We append, according to custom, Reports by the chief Officers of the General Prison down to the close of the year, referring to them for information on the following particulars, viz. :— Reports by Chief Officers.

To the Governor's Report for information on— App. No. VI.
- The adjustment of the Staff, and the conduct of the Officers.
- The general Statistics of the Establishment.
- The Discipline of Prisoners.
- The Labour of Prisoners.
- The Industrial Training of Prisoners.
- The Exercise of Prisoners.
- The Conduct of Prisoners.
- The Receipts and Expenditure, and the relative Cost of the Establishment. App. No. XI.

To the Chaplain's Report for— App. No. XII.
- The Religious and Secular Instruction of Prisoners.
- The Educational Statistics.
- The Prospects and Condition of Liberated Prisoners.
- Re-imprisonments and other matters bearing generally on the Moral influence of the Discipline.

To the Resident Surgeon's Report for— App. No. XIII.
- The Health, mental and bodily, of Prisoners.
- The Illnesses, and their Causes and Treatment.
- The Deaths.
- The Management of the Lunatic Department.
- The Management of the Hospital Department.
- The general Sanitary Condition of the Establishment.

The Appendix also contains— App. No. VII.
1. An analysis of the ages, with reference to their respective sentences, of all the prisoners who were, during the year, in the Penal Department of the Prison.
2. Table of the number of prisoners received during the year from each county in Scotland. App. No. VIII.
3. Table of the offices and emoluments of the Staff. App. No. IX.

Our anticipation in our Reports for 1866 and 1867 that the works which in previous years we had thought necessary would not require to be extended has been realized. The buildings of the Penal Prison are compact, secure, and well adapted for carrying out the discipline of the establishment, and the houses, store-rooms, and other out-buildings are sufficient for their respective purposes. We consequently made no estimate for the existing financial year, and we have rendered none for the year to end in March 1871. Her Majesty's Commissioners in Lunacy have occasionally suggested improvements which they consider desirable in the Lunatic Department. We think, however, that the most satisfactory method of dealing with these will be for the Board of Lunacy to anticipate all the improvements that are likely to be desirable for a considerable period to come, and to bring them under your notice either specially, or in their Annual Report. Condition of the Building.

We have nothing of a special nature to report on in relation to the staff. No alteration was made in its constitution or emoluments during the year. The most important personal change was the appointment by the Secretary of State of Mr. The Staff.

Henry May to the joint offices of Deputy-Governor and Steward, vacant by the incapacity for duty of the previous holder of the office, as stated in our Report for 1867.

· Discipline.

The system of discipline for Prisoners under sentence of imprisonment, and for Convicts while in the probation class, is still 'the Separate System.' For some time, however, the separation has been so far modified that no attempt has been made, by masks or otherwise, to prevent the recognition by each other of the inmates. It was found, in fact, impossible to prevent those experienced Criminals, as to whom the prevention of recognition was most important, from being conscious of each other's presence. Separation in airing-yards and at worship has been modified, but not entirely abolished. Experience of this modification has shown that, in the general case, the Officers have more perfect command over the conduct of the Prisoners when they are in each other's presence at exercise or worship, than when each is in a separate yard or stall. At the same time, the possession of separate airing-yards, and a few separate stalls in the chapel, is a useful means of enforcing discipline. With the Open System it is absolutely necessary, for the prevention of serious outbreaks, that the slightest irregularity should at once be stopped. When there is a general restlessness, in which several are partakers, it is difficult to find who is to blame, and consequently to be punished. It has a sedative effect, on such occasions, to put the whole group into Separation for a time, informing them that the Open System is for their health and enjoyment, and that, unless they co-operate so as to make it easily practicable, it cannot be extended to them.

e Mark System.

The 'Mark System' has now been employed since 25th July 1864 for testing the claims of Female Convicts for liberation on Order of License—commonly called Ticket-of-Leave. Under the old system, by which a fixed period of remission is credited, and acts of misconduct debited against it, there were at the end of the year 47 Female Convicts. The number under the Mark System, at the same period, was 174. The machinery for giving effect to the Mark System has been fully described in the more recent of our previous Annual Reports. To keep in view its general character it is only necessary to remember that one-third of the period of the Convicts' sentences is balanced against a certain number of marks, which, in their turn, represent a certain amount of work, and the Convict earns either the whole or a part of the period of remission according to the number of marks credited to her. The superior Officers of the Prison retain the opinion, formerly reported, that the System is favourable to the promotion of industry, and we think they are justified in that opinion.

plication of the rk System to Dis- ed Convicts.

The only difficulty felt by us in the arrangement was its application to Prisoners disabled by sickness. To deny them all remission on account of their inability to work and gain marks, seemed, in the case of the well-conducted, to be a hardship. At the same time, as marks are the representative of work, we feared that if they were credited to the sick, who did no work, the result might be a relaxation of the System, by neutralizing in the minds, both of Officers and Convicts, the absolute rule, that marks are to be gained by industry alone, although, when so gained, they may be forfeited for misconduct. With the sanction of the Secretary of State we gave an instruction that, when the Convict is permanently disabled, no marks shall be recorded, but the Convict's claim to remission on other grounds than industry shall be specially reported to the Secretary of State. In cases of temporary illness, the alternative is to record the average number of marks made during periods of good health. As the Prison is very healthy, the occasions on which these exceptional arrangements have been adopted have been very rare. It has been found, in certain instances—but these too are very rare—that a healthy Convict prefers the prospect of remaining in detention to the end of her sentence, instead of doing daily the day's work which would entitle her to remission.

nvicts liberated on cense. pp. No. XVII.

In the Appendix will be found a Table stating, in relation to Convicts who have received Orders of License, the periods remitted to them, their prospects on liberation, and other particulars.

e.lth.

The Prison was healthy during the year. It will be seen by the Report of the Resident Surgeon that the number of deaths was 11. It happens that this is exactly the average of the whole deaths over the interval of twenty-seven years—1·5 per cent. On one of these deaths, in the Lunatic Department, we report specially further on. We also refer to the increase in the number of Prisoners, and the consequent enlargement of their period of detention in Local Prisons, as injurious to their condition when they are removed to the General Prison.

ale Convicts brought m Prisons of Edin- rgh and Glasgow— ietary in other isons.

In the month of March we found it necessary to bring under the notice of the authorities at the Home Office that, from statements made by the Resident Surgeon, and other matters falling under our notice, we had reason to believe that, in the Prison

of Edinburgh and the Prison of Glasgow, Male Convicts under sentence of Penal Servitude did not receive the Dietary prescribed by the Rules adopted and issued by the Secretary of State for the Home Department. The 'Rules for the Dietaries of the Prisons in Scotland' were certified under the Act by Sir George Grey in 1866. They contain several Scales of Dietary, and the Scale No. VII., for 'Adult Males under sentence of Penal Servitude, and not employed at public works,' is the Dietary in question. On an explanation being required by the Secretary of State, it was admitted, on the part of the County Board having charge of each of these Prisons, that a Dietary, different from that of Table VII., had, by their direction, been served to Adult Male Convicts. It was further stated, on the part of each Board, that after receiving the Secretary of State's letter of inquiry, directions had been given for the use of the Dietary in the Scale No. VII. in the meantime, while each Board, at the same time, submitted to the Secretary of State another Scale of Dietary for Adult Male Convicts, recommending that it should be substituted by the Secretary of State for the Dietary in Scale VII., which had already received his sanction. On this proposal a Report was prepared by Mr. J. B. Thomson, L.R.C.S., under the supervision of Dr. Christison. On considering this Report, which is printed in the Appendix, Mr. Secretary Hardy decided that it left him no alternative but to require that the County Prison Boards of Edinburgh and Lanark respectively should, in future, comply with the Rules for the Dietaries of the Prisons in Scotland, as authorized by the Secretary of State in terms of Section 9 of the Prisons (Scotland) Administration Act.

Twenty-eighth R on Prisons, App III.

App. No. XXV.

The management of the Lunatic Department has been satisfactory, with an unfortunate exception. On the 19th of November, Alexander Molleson, aged 20, who having been indicted on a charge of assault with intent to murder, was put at her Majesty's disposal on the ground of lunacy at the time of committing the crime charged against him, died from external causes. Two days before, on the 17th, he had slipped from the general dining-room into the bath-room, where he sat down in the boiler. The water in the boiler was not far below boiling point, and though he was speedily removed, he was found to be considerably scalded. The medical authorities attributed his death chiefly to the shock which his system had received. The matter was investigated not only by the Managers, but by the Commissioners in Lunacy, and the Procurator-Fiscal. According to an old regulation of the Lunatic Department, the bath-room ought not to have been left unlocked. We could not entirely acquit from blame the Superintendent of the Department for failing to bring this under the notice of the person in charge. At the same time, the circumstances connected with the incident suggested to us a feature in the general organization of the establishment which called for attention. The various duties so fully occupy the Staff, that when any Officer requires to be absent from duty, owing to illness or other temporary cause, it is necessary that an additional person should immediately be employed. The persons who consent to accept such casual employment have no chance of being recommended for permanent appointment—such recommendations being only given to persons who, after full inquiry into their merits, have been employed on trial to fill permanent vacancies. The person in charge of the inmates of the dining-room of the Lunatic Department when this accident occurred was casually employed in this manner. The Governor is instructed to employ such persons in such available shape as will throw on them the smallest amount of charge and responsibility.

Lunatic Departm

Death of an Inm

In the Prisons Administration Act it is provided, that 'one or more of the 'Managers shall, once at least in every month, see and communicate with each Prisoner, 'shall examine the books, accounts, and documents kept in the Prison, shall inspect 'the Prison premises and stores, shall examine into the conduct of the several officers, 'shall investigate all complaints, and alleged or apparent abuses or deviations from the 'rules, shall inquire into the cause and nature of every punishment that has been 'administered, shall ascertain how far the health, education, and industrial training 'of the Prisoners are in a satisfactory condition, and shall make a report, in writing, 'under these heads, which shall be laid before, and specially considered by, the 'Managers.'

Sect. 61. Monthly Visits of Inspection.

This provision was punctually carried out during the year 1868, as it had been throughout all the other years since the Act came into effect. The Reports of the several visits during last year were satisfactory in showing that the discipline of the Prison was throughout effective.

By a contract between the Government and the Prison Board of Ayr in 1863, a certain number of Female Convicts are detained in the Prison of Ayr. For the operation of the arrangement during the year we refer to the papers furnished to us and printed in the Appendix.

Female Convicts Prison of Ayr.

App. No. XVIII.

ath of Governor of
ison of Ayr.

Although we have no power of direct interference in the management of the Prison, yet the character and conduct of the Officers employed by the County Board are of course a matter in which it is our duty to interest ourselves. We regret to have to state that, in the month of June, Mr. Robert Sutherland, who had been Governor of the Prison since August 1865, committed suicide in London. The act was the result of a visitation of insanity, to which, so far as we can discover, nothing in Mr. Sutherland's conduct had contributed. We think it justice to his memory to state this, because part of his disease consisted of delusions about his own conduct. Some rumours, probably occasioned by these delusions, induced us recently before his death to make a close inquiry into his conduct, and it was found to be irreproachable. He was an able and zealous Officer, who might have looked to any preferment which the Department could offer. On his death, the County Board appointed as Governor Mr. James Taylor, a meritorious Officer, who has been trained, like his predecessor, by the Governor of the Prison of Edinburgh.

MISCELLANEOUS FUNCTIONS.

turns of Statistics.

The various returns which we receive from the Officers of County Boards, under the Statute and the Instructions of the Secretary of State, were rendered during the past year with more than the usual punctuality. Even in the one or two counties which were an exception to the regularity prevailing in all the others, there has been recent improvement.

son Board of
thness.

We have had in several successive Reports to complain of the difficulty of getting Statistical returns from the County Board of Caithness, and of other irregularities on the part of the Officers in the employment of the Prison Board of that county. It was at one time under the consideration of the Secretary of State whether an inquiry on oath should be made, under sect. 58 of the Prisons Act, with a view to the dismissal of any paid Officer found to be implicated in these irregularities. It happened from official changes and other incidents that the question was protracted, and it was considered that, in the meantime, it would be desirable to know precisely whether the County Board would take steps for a remedy before resuming the consideration of the matter from without. As it was questionable how far the members of the Board were really aware of these irregularities, it was found to be desirable that one of the Managers should visit the spot and confer with them. This was done, and the result of the conference was that the Chairman and other gentlemen of the Board gave assurance that they would no longer tolerate the negligence out of which the irregularities had arisen. It is due to them to say that ever since that conference, which was held in the month of June, the business of the Board has, so far as we are concerned, been transacted with scrupulous punctuality.

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urso under the
mmary Procedure
t.

On the same visit, occasion was taken to communicate with Members of the Police Committee of the county, and their Officers, on an application to the Secretary of State to license Police Cells in the town of Thurso for imprisonment under short sentences, in terms of the power contained in the Summary Procedure Act. It was found that the official organization of the Police in the district was in every way favourable to the proposal, but that the cells themselves were defective in means of ventilation and of heating. We were informed that the Police Committee would take steps for the removal of these defects, but at the end of the year we had received no intimation of their having done so.

In accordance with long-established practice, we bring under your immediate notice, in the body of our Report, a comparative Table of the daily average of Prisoners in the Prisons of Scotland, by continuing the Table of last year down to the end of 1868.

AVERAGE DAILY NUMBER OF PRISONERS IN THE PRISONS OF SCOTLAND FROM 1840 TO 1868 INCLUSIVE, EACH YEAR ENDING IN DECEMBER.

Table of averag bers of Prisoner 1840.

Period.	Civil.			Criminal.		
	Males.	Females.	Total.	Males.	Females.	Total.
In 1840	98	10	108	1,264	676	1,940
1841	90	7	97	1,222	742	1,964
1842	88	6	94	1,557	865	2,422
1843	84	6	90	1,499	789	2,288
1844	83	5	88	1,492	766	2,258
1845	69	5	74	1,323	769	2,092
1846	54	6	60	1,359	848	2,207
1847	44	2	46	1,596	932	2,528
1848	51	2	53	1,928	1,041	2,969
1849	58	4	62	2,035	1,108	3,143
1850	68	1	69	1,974	1,016	2,990
1851	75	1	76	1,885	1,015	2,900
1852	78	4	82	1,915	1,004	2,919
1853	66	2	68	1,771	953	2,724
1854	55	4	59	1,742	924	2,666
1855	57	5	62	1,452	864	2,316
1856	69	3	72	1,239	971	2,210
1857	56	2	58	1,196	1,005	2,201
1858	70	2	72	1,119	995	2,114
1859	69	1	70	1,098	1,093	2,191
1860	62	2	64	1,044	1,057	2,101
1861	57	2	59	1,072	1,011	2,083
1862	68	2	70	1,211	1,014	2,225
1863	81	2	83	1,347	1,055	2,402
1864	67	5	72	1,345	1,112	2,457
1865	59	3	62	1,294	1,122	2,416
1866	62	3	65	1,309	1,085	2,394
1867	54	4	58	1,432	1,045	2,477
1868	72	4	76	1,538	1,019	2,557

Increase of nur of Prisoners.

This Table reveals the unpleasant fact that, taken on the average throughout the year, the inmates of our Prisons have continued on the increase. It will be seen that the number is still far below what it was in 1849, when the population of the country was considerably under what it now is, the number in that year being 3143. From that period there was a steady decrease down to the year 1861, when the number was 2083. In the quarter ending in March of that year, the number had descended below 2000. It will be seen that while the descent was progressive, the late tendency towards an increase has been fluctuating.

Looking to the quarterly returns, it will be seen that in September 1867 the average number had reached 2570. The number for last September quarter was 2622, being still an increase, though it will be perceived that it is an increase at a subsiding rate. Our separate returns for these two quarters afford a more decided evidence of reaction in an actual decrease of the number in custody on the last day of the quarter. On 30th September 1867, the number was 2555, and on 30th September 1868, it was 2534. The two December quarters show the turn towards a decrease still going on. The number on the last day of the year was in 1867, 2534, and in 1868, 2439, a difference of 95. There was at the same time a decrease in the daily average, which was 2533 in the December quarter of 1867, and 2498 in 1868. This difference in the average, being so much less than the difference in the end of the year, shows that the decrease was in progress and increasing at the end of the quarter.

Relation of num to Prison accom tion.

The question whether or not these figures express a decided check on the tendency to increase, and the resumption of that progressive decrease which was so remarkable a feature in our statistics from 1850 to 1861, is of importance in relation to Prison accommodation, as well as to the state of crime. By the ratio of new buildings opened to old buildings closed, the amount of Prison accommodation throughout the country has a natural tendency to fit itself to the number of persons likely to occupy the Prisons for the time being. The pressure on the accommodation of Local Prisons during the past two years has been felt in the removals of the long-sentenced Prisoners to the General Prison. The whole accommodation of that Prison is always in full use so long as the Female Convicts, the Male Convicts in the probation period, and the males and females under sentence of nine months and upwards, throughout Scotland, make a number

sufficient to fill it. Until lately, it just sufficed for its purpose, for while there rarely were many vacancies in the Prison, it could receive all the long-sentenced Prisoners immediately after sentence. But during last year the Prison was found insufficient for this purpose to a small extent on the female, and to a large extent on the male side. Hence many of these long-sentenced Prisoners had to be detained for a considerable portion of their sentences in Local Prisons. There were thus detained among the males for one month and not above two, 56; above two months and not above three, 150; above three, 138. This not only has a tendency to overcrowd the Local Prisons, but some of these are not well adapted for long-sentenced Prisoners, even during a portion only of the long sentence.

There would be a remedy for this evil if there happened to be any Local Prison which, like the Prison of Ayr, is at all times too great for the wants of the District. With the County Board in charge of such a Prison, a contract might be made for the custody of Government Prisoners as in the case of the Prison of Ayr. The only other Prison, however, which seemed likely to afford such relief, was the Prison of Edinburgh; but a closer examination of its uses showed that there was to be no relief in that quarter. The number of cells is 435, and the daily average number of Prisoners was 353, leaving, apparently, 82 vacancies. But the inmates of that Prison fluctuate so widely in number, that the highest number at any time during the year exceeded the number of cells by 46. This was on the 24th of August 1867, when the number was 481. On the 13th of January 1868, the number was 263.

ised Scale of tary.

A revised scale of dietary has been in use throughout the Prisons of Scotland since 7th May 1866; it was founded on the report of a scientific inquiry into the existing dietary, which had been so long in existence as to enable the records of the various Prisons to furnish much minute information on its character. The new dietary was in general a reduction on the scale of the old, and therefore the question of its efficiency, as shown in practice, was a matter of anxiety. The portion of the dietary applicable to the General Prison was soon seen to be eminently satisfactory. Some slight suspicion, as to the sufficiency of the scale applicable to untried Prisoners, if it happened that they were to receive long sentences, was occasioned by some Prisoners coming to the General Prison affected by scrofula, or with the seeds of that disease in their constitutions. The inmates of the Prisons of Scotland, when the late General Board undertook their management, were so liable to this disease, which was prone to attack the glands of the throat, that it was generally called 'Prison neck.' The change of management, beginning in 1840, appeared to have exterminated it, when it had thus a partial revival. On consideration of the matter, however, it did not appear that health was injured by the Prison food, except in the two instances elsewhere mentioned, in which there was a departure from the certified dietary.

In the discussions on questions of Dietary with our medical advisers, some doubts occurred on the applicability of the scale to those Prisoners who are detained in Prison for a long period before trial, when it happens that the sentence turns out to be a long one. It is at the same time clear that it is impossible to provide absolutely for such cases. Adult males, for instance, when untried, receive the same dietary as those sentenced for periods above two months and not above six months, and not with hard labour. But the sentence may be for a year with hard labour, and if the Prisoner has been several months on the lower diet, it may be supposed that his capacity for enduring such a sentence is impaired. On the other hand, if the rule were altered, so that after a certain period of detention—say two or three months—the diet of an untried Prisoner under a heavy charge should be made more nutritious, it might happen that he is acquitted. The extent to which cases of difficulty are likely to occur has, however, been greatly modified by the Court of Justiciary Act of 1868, which provides that Prisoners may be brought from the Circuit Districts to Edinburgh, where, if they plead guilty, they may be dealt with by the High Court of Justiciary. There is no arrangement for trial by the citation of Jury and witnesses, and the Prisoner goes back to the Circuit District if he resolves to stand a trial, but the arrangement will materially abridge the time spent in Prison before trial of those who intend to plead guilty.

lers by Secretary State licensing isons.

Among the documents appended to the Report are, in terms of the instructions in the Statute, every Order issued by the Secretary of State under Sect. 27, which either licenses any new building for Prison purposes, or alters the purposes for which any existing Prison could be lawfully applied. The orders issued during the year, and printed at length in the Appendix, were adapted for the purposes following:—

p. No. II. ison of Aberdeen.

The Prison of Aberdeen has heretofore consisted of two buildings, upwards of a mile distant from each other, called the East and the West Prison. The West Prison was an old, defective building, and for some years previous to the year 1867 it had

not been used as a Prison, the East Prison, which is a better building, being found sufficient for the wants of the district. In the winter of 1867 the Secretary of State approved of certain alterations and additions, proposed to be carried out in the East Prison, and of an arrangement for resuming the use of the West Prison, and detaining all the Prisoners there while these new works were in progress. The works having been completed to the satisfaction of Her Majesty's Inspector, an Order of License was issued on the 9th of December last, bringing the building, as altered and enlarged, into use, as a place of detention for all descriptions of Civil and Criminal Prisoners, as on the 11th day of January 1869. By the same order the building called the West Prison was to cease to be a legal Prison on and after the 18th day of January 1869.

Prison of Wick.

Connected with the proceedings regarding the Prison Board of Caithness, elsewhere referred to, was the belief, supported by the opinion of Her Majesty's Inspector, that the Prison of Wick was not of a suitable construction for the detention of Prisoners during the latter portion of long sentences. Under the powers in the Statute, therefore, the Secretary of State issued a new license, changing the classes of Prisoners for which the building is a legal place of detention, and limiting the period of the detention of Prisoners under sentence to four months. By the same order it was provided that the Prisoners who would thus cease to be legally detainable in the Prison of Wick should be removed to the Prison of Aberdeen.

Prison of Dundee

The County Board of Forfarshire were desirous to readjust the accommodation of the Prison of Dundee by enlarging the Male side, by means of a reduction on the Female side. As some of the cells in that Prison are, in the opinion of Her Majesty's Inspector, too small to be safely occupied by Prisoners during long sentences, an opportunity was taken, in renewing the License of the Prison, to limit the detention of any Prisoners in these cells to a period not exceeding fifteen days. This is a novelty in the Prison arrangements in Scotland, since it is the first occasion in which any difference has been made between the limits of detention in different parts of the same Prison.

Suicide in Prison Cupar.

Under the arrangements for inquiry into acts of Suicide in local Prisons, we reported to you one such act as having been committed during the year. It occurred in the Prison of Cupar, in Fife, where, on the 11th February, a convicted Male Prisoner committed Suicide by hanging himself in his cell. The matter was investigated by the County Board, and by the Procurator-Fiscal on the part of the Crown. It did not appear that blame attached to any Prison Officer.

Escapes.

Under the arrangements for inquiry into such occurrences, three escapes from local Prisons were reported to you during the year.

From Prison of W

On the 8th of February an untried Male Prisoner, a boy 11 years old, escaped from the Prison of Wick. It appears that the chief cause of his escape was a structural deficiency, in consequence of which the officer in charge has no means of securing the Prison Gate from the inside. The County Board are aware of this defect, and Her Majesty's Inspector is likely to observe whether it is remedied. The boy was immediately recaptured, and was only absent from the Prison about three hours.

From Prison of Lanark.

On the 17th of April a convicted Male Prisoner escaped from the Prison of Lanark, by using a ladder which had been brought into the Prison, and was negligently left within his reach. There was carelessness on the part of a subordinate officer, but Her Majesty's Inspector, on inquiry into the matter, could not entirely acquit the Governor of failure to exercise a necessary vigilance. A large proportion of escapes from Prisons have been accomplished by ladders either lying unwatched in the intervals of use, or imperfectly secured. The proper lesson from such occurrences is, that no ladder should be within a prison unless while it is in the actual hands of the workman using it. Whatever vigilance there may be on the side of the Officers, there is greater vigilance on the side of the Prisoners, who are sure to take immediate advantage of any opportunity offered to them.

From Prison of Hawick.

On the 7th of September a convicted Male Prisoner escaped from the Prison of Hawick, in the county of Roxburgh. He was retaken within two hours; and as the County Board appeared to have taken the necessary precautions for the future, no special steps were thought necessary in the matter.

Lanarkshire Prisc Act.

During the year an Act was passed relating to the Prisons Department (31 & 32 Vict. c. 50) which, although it is a Public General Statute, is in reality of local import as relating to the County of Lanark. In the other Counties of Scotland there is a Central County Prison in the most populous town; any other Prisons in the county being small in size, and requiring only a small portion of the Prison Assessment for their support. But in Lanarkshire there are, besides the Prison of Glasgow, three large Prisons,—at Lanark, Hamilton, and Airdrie, respectively. The pecuniary inter-

ests of different parts of the county rendered it expedient to divide it into two districts, each having a separate Prison Board—the Northern District comprehending the Lower Ward, and the Southern District comprehending the Middle and Upper Wards.

ovals of Prisoners. No. XXIII.

We directed and superintended throughout the year the removal of Prisoners from one Prison to another, in terms of Sect. 67 of the Prisons Act. For particulars of this service in relation to Convicts, we refer to the Table in the Appendix.

ovals under Court isticiary Act, .

In the Act above referred to, for bringing Prisoners under charges in the Circuit districts to Edinburgh, and taking their plea before the High Court of Justiciary, it is provided that the removals of these Prisoners may be effected under our direction, in terms of the clause to that effect in the Prisons Administration Act; and we were required by the new Act to make Regulations 'as to the mode in which, and the officers 'by whom,' the Warrants of the Court shall be executed. We took occasion, on making these additions, to recast the whole of the Regulations for the Removal of Prisoners as they will be found printed in the Appendix.

. No. XXVI.

nge in Method of ping Accounts ughout the Civil ice.

Along with the other Departments of the Civil Service, we have had to alter the method of rendering our Annual Estimates and Monthly Accounts. The change began with the existing financial year, that is, on 1st April 1868. The new form had been adopted in rendering the estimates at an earlier period; but both the votes for the service, and the accounts of the expenditure of that service, were to come under the new arrangement at that date.

The object of this arrangement we understand to be, that each Department with a responsible head is to have its own vote, against which it is to render its own account. Under the previous system it might happen that a Department drew on two or more votes, and that one vote was open to the drafts of several Departments. Hence it might happen that some Departments had overdrawn their estimate, the money being supplied by a balance of the vote existing in the shape of a surplus, because other Departments did not require the full sum estimated for. At the same time, if there was a general surplus or balance of the vote unissued at the end of the year, it formed a disposable fund for ensuing years, in addition to the actual sum voted by Parliament for those years. The object of the new arrangement is, that each vote shall be a credit for the year in favour of the Department for the service of which it is voted. Against this amount all drafts are debited, and any balance undrawn is extinguished, the account for the ensuing year being opened against the vote for that year. The account, as given in the Appendix, is in the form prescribed by the Treasury under the new system. That account will be seen to be divided under certain heads, and it is under precisely the same heads that the sums stated in the Annual Estimate and vote are ranged.

. No. XIX.

Under the previous practice all payments for the service of the Department were made out of issues, from time to time obtained from the Treasury, through the Home Office. They are now in every instance, where the amount exceeds £5, made not in cash, but by a draft on the Remembrancer in Exchequer in favour of the receiver. Our accounts are rendered monthly to the Audit and Exchequer Department, and each monthly account not only debits us with the drafts on Exchequer for that month, but shows in a side column all the drafts from the beginning of the financial year, under each head, as against the total amount, and the amount under each head, of the Parliamentary vote.

Through the exertions of Mr. De Maria, the chief clerk of the Department, this new arrangement was speedily brought into complete working order. Its organization was much facilitated by the courteous information and suggestions contributed to the Department by Mr. Foster and Mr. Vine, of the Treasury, who were commissioned by Government to examine the accounts of the several public departments while the adjustment of the new system was in progress.

The amount voted by Parliament for the expenses of the Prisons Department for the year ending 31st March 1869, was £24,267; and the account of charge and discharge for the year ended 31st December 1868, which will be found in the Appendix in detail, stands as follows:

Receipts—being Charge.

Balance on 1st January 1868,	£5,345	4	0
Cash from Treasury,	23,132	17	3
Cash for Manufactured Goods and Old Stores at the General Prison,	5,535	4	0
Amount received for issues from the Store for use of the Prison,	1,003	14	9
Interest from Bank,	19	1	11
	£35,036	1	11

Expenditure—being Discharge.

Managers' Department,	£1,569	2	9
General Prison at Perth,	27,504	4	9
Maintenance of Convicts in Ayr Prison,	2,270	5	10
Escort and Conveyance of Prisoners,	1,717	1	0
Balance due by Managers at 31st December 1868,	1,975	7	7
	£35,036	1	11

The Treasury refund to County Boards the cost of maintenance of convicted Prisoners who have either been tried by Jury or committed on Sheriffs' warrants. The amount does not pass through our hands, but is paid by the Remembrancer in Exchequer. He has furnished us with the Table of Expenditure under this department for the half-years ending 31st March and 30th September 1868, printed in the Appendix, which shows the amount for the year 1868 to be £5,493, 14s. 10d., including £53, 11s. 3d. of arrears.

Thus the total expenditure of moneys voted by Parliament for the Prisons Department in Scotland for the year 1868, of which we are enabled to give an account, stands thus :—

Current expenses of Managers,	£1,569	2	9
Current expenses of General Prison, including New Buildings and Repairs,	27,504	4	9
Expense of maintaining Female Convicts in Ayr Prison,	2,270	5	10
Escort and Conveyance of Prisoners,	1,717	1	0
Maintenance of Prisoners in Local Prisons,	5,493	14	10
	£38,554	9	2

Assessments Vot by County Board Appendix No. X

By your direction, County Boards furnish us with returns of the assessments annually voted by them for the current expenses of their Prisons, and for building purposes, with a statement of the portions to be levied on landward or rural and on burghal districts respectively. A Table of these returns, printed in the Appendix, shows the amount voted throughout the counties to have been as follows :—

For Current Expenses.				For Building Expenses.			
Rural,	£22,773	4	0	Rural,	£1,504	7	2
Burghal,	15,324	5	10	Burghal,	1,160	6	2
	£38,097	9	10		£2,664	13	4

Arrangements fo Collection and P cation of Judicia Statistics.

In conclusion, we think it right to state that the present is probably the last of our Reports which will be followed by the large body of Criminal Statistics, which, according to the practice established by the late General Board is embodied in the Appendix of the Annual Report on Prisons. The Government have recently determined that the Judicial Statistics of Scotland, Civil and Criminal, shall be collected and published on a comprehensive scale. As great part of this work has heretofore been done by this Department, it was a natural and economic arrangement that the remainder should be brought to it, instead of being put into the hands of a new Department established for the purpose. The arrangement as finally adjusted is, that the Stipendiary Manager becomes *ex officio* Superintendent of the Department of Judicial Statistics, a paid Officer being appointed to work out the details of their collection and arrangement. Mr. William Veitch was appointed to this office by the Secretary of State, who, in the letter of appointment, states him to 'be specially qualified for the 'work he will have to perform.' He will be assisted by Mr. Donaldson, who has gained much experience by forming the Statistical Tables appended to our Annual Reports.

The bulk of our Statistics applies to the year ending on the last day of June. It has been found desirable that the various branches which will go to form the 'Judicial Statistics of Scotland' should apply to the year ending in December. To avoid any break in the continuance of the Criminal Statistics as now rendered by us, they are issued on the present occasion in the usual manner, and when the new department obtains and publishes them for the year ending in December 1868, the only irregularity will be that, for the period from the beginning of the year to the end of June, they will appear in two different places and shapes.

We have the honour to be,

SIR,

Your very obedient Servants,

JOHN TAIT.

CHARLES MORTON, CROWN AGENT.

HERBERT P. VOULES.

J. H. BURTON.

APPENDIX.

No. I.—A LIST OF THE PRISONS IN SCOTLAND

(AS AT 1ST JANUARY 1869).

With a reference to any Declarations by the late General Board of Prisons or Orders by the Secretary of State defining the purpose for which they are legal.

LOCAL PRISONS.

ABERDEEN—*Aberdeen.*—Legalized in 1840. Consists of two edifices, called the East and West Branches. Second Report, pp. 18-20.

(*N.B.*—In the course of January the East Prison, as recently enlarged, became the sole Prison of Aberdeen, the West Prison being closed. See Secretary of State's Order, App. II. p. 18.)

Peterhead.—Legalized in 1845. Certain classes of civil prisoners excepted. Period for convicted prisoners, not exceeding 60 days. Seventh Report, p. 10.

Huntly.—Legalized in 1847. All classes of civil prisoners excepted. Period for convicted criminals, not exceeding 10 days. Ninth Report, p. 16.

Fraserburgh.—Legalized in 1848. All classes of civil prisoners excepted. Period for convicted criminals not exceeding 10 days. Tenth Report, p. 15.

ARGYLE—*Inveraray.*—Legalized in 1848. Tenth Report, p. 15.

Campbeltown.—Legalized in 1847. Ninth Report, p. 16.

Tobermory.—Legalized in 1865, Twenty-seventh Report, p. 11.

Fort-William.—Common to the Counties of Argyle and Inverness. Legalized in 1849. All classes of civil prisoners excepted. Period for convicted criminals not exceeding 60 days. Eleventh Report, p. 15.

AYR—*Ayr.*—Legalized in 1853. Fifteenth Report, p. 24.

Kilmarnock.—Legalized as altered and enlarged in 1867. Twenty-ninth Report, p. 16.

BANFF—*Banff.*—Legalized in 1844. Sixth Report, p. 19.

Keith.—Legalized in 1844. Certain classes of civil prisoners excepted. Period for convicted prisoners not exceeding 10 days. Sixth Report, p. 19.

BERWICK—*Greenlaw.*—Legalized before the constitution of the General Board. Fourth Report, p. 17.

Dunse.—Legalized in 1843. Certain classes of civil prisoners excepted. Periods on warrants of imprisonment not exceeding 14 days. Fifth Report, p. 17.

BUTE—*Rothesay.*—Legalized as altered and enlarged in 1867. Twenty-ninth Report, p. 16.

CAITHNESS—*Wick.*—Legalized before the constitution of the General Board. Seventh Report, p. 12. Period for convicted prisoners limited to 4 months, as per Secretary of State's Order in App. No.II. p. 18.

CLACKMANNAN—*Alloa.*—Legalized in 1853. Fifteenth Report, p. 26.

DUMBARTON—*Dumbarton.*—Legalized as enlarged and altered in 1855. Seventeenth Report, p. 16.

Kirkintilloch.—Legalized in 1844 in the same terms as Helensburgh. Sixth Report, p. 21.

Helensburgh.—Legalized in 1843. Certain civil prisoners excepted. Period for convicted prisoners, not exceeding ten days. Fifth Report, p. 19.

DUMFRIES—*Dumfries.*—Legalized in 1851 and 1852. Thirteenth Report, p. 21, and Fourteenth, p. 19.

EDINBURGH—*Edinburgh.*—Legalized in 1847. Ninth Report, p. 19.

The Court Buildings' Prison, legalized in 1857, is part of the Prison of Edinburgh, for criminal prisoners only, on the condition that none are to be detained in it beyond ten days at a time. Nineteenth Report, p. 12.

Musselburgh.—Legalized in 1840. Certain classes of civil prisoners excepted. Convicted prisoners not to be detained more than 30 days. Fifth Report, p. 21.

ELGIN—*Elgin.*—Fifth Report, p. 21. Legalized as altered and enlarged in 1866. Twenty-eighth Report, p. 17.

Forres.—Legalized in 1850. All classes of civil prisoners excepted. Period for convicted criminals not exceeding 10 days. Twelfth Report, p. 18.

FIFE—*Cupar.*—Legalized in 1844. Sixth Report, p. 23, and Fifteenth Report, p. 27.

Dunfermline.—Legalized in 1844. Sixth Report, p. 23.

FORFAR—*Dundee.*—Legalized in 1845. Seventh Report, p. 15. Legalized as altered in distribution of accommodation in 1868. See Secretary of State's Order in App. No. II. p. 18.

Forfar.—Legalized in 1852. Fourteenth Report, p. 20.

HADDINGTON—*Haddington.*—Legalized in 1847. Ninth Report, p. 21.

Dunbar.—Legalized in 1864. Period for convicted prisoners, not exceeding 10 days. Twenty-sixth Report, p. 8.

INVERNESS—*Inverness.*—Legalized in 1849. Eleventh Report, p. 19.

Portree.—Legalized in 1848, on the same conditions as Lochmaddy. Tenth Report, p. 20.

Lochmaddy.—Legalized in 1848. Period for convicted prisoners, not exceeding 60 days. Tenth Report, p. 20.

Fort-William.—Already mentioned as common to the Counties of Argyle and Inverness; it is under the management of the Prison Board of the County of Inverness.

KINCARDINE—*Stonehaven.*—Legalized as altered and enlarged in 1867. Twenty-ninth Report, p. 16.

KINROSS—*Kinross.*—Legalized in 1845. Seventh Report, p. 17.

KIRKCUDBRIGHT — *Kirkcudbright.* — Legalized in 1866, Twenty-eighth Report, p. 17.

Maxwelltown.—Legalized before the constitution of the General Board.

LANARK—*Glasgow.*—Legalized in 1841 and 1853. Fifteenth Report, p. 29.

The Court Buildings' Prison, legalized in 1862 as part of the Prison of Glasgow, for criminal prisoners only, on the condition that no one be detained in it longer than 48 hours at one time. Twenty-fourth Report, p. 13.

Lanark.—Legalized before the constitution of the General Board. Fourth Report, p. 23.

Hamilton.—Legalized before the constitution of the General Board. Fourth Report, p. 23.

Airdrie.—Legalized in 1859.—Fifth Report, p. 25; Fifteenth Report, p. 24; and Twenty-first Report, p. 8.

LINLITHGOW—*Linlithgow.*—Fifteenth Report, p. 29. Legalized as altered in 1867. Twenty-ninth Report, p. 16.

NAIRN—*Nairn.*—Legalized in 1846. Fifth Report, p. 26, and Eighth Report, p. 19.

ORKNEY—*Kirkwall.*—Legalized before the constitution of the General Board. Second Report, p. 49.

PEEBLES—*Peebles.*—Legalized in 1844. Sixth Report, p. 27.

PERTH—*Perth.*—Legalized in 1845. Seventh Report, p. 19.

Police Cells at Perth.—A legal place of confinement for periods not exceeding 3 days.

Dunblane.—Legalized in 1843. Period for convicted prisoners, not extending to 3 months. Fifth Report, p. 27.

RENFREW—*Paisley.*—Legalized in 1853. Fifteenth Report, p. 30.

Greenock.—Legalized in 1857. All classes of civil prisoners excepted. Period for convicted criminals, not exceeding 20 days. Fifth Report, p. 28, and Nineteenth Report, p. 13.

Pollockshaws.—Legalized in 1846. Certain civil prisoners excepted. Period for convicted prisoners, not exceeding 10 days. Eighth Report, p. 20.

ROSS & CROMARTY—*Dingwall.*—Legalized in 1845. Seventh Report, p. 21.

Tain.—Legalized in 1846. Period for convicted prisoners, not exceeding 60 days. Eighth Report, p. 20.

Cromarty.—Legalized in 1847 on the same conditions as Tain. Sixth Report, p. 29, and Ninth, p. 24.

Stornoway.—Legalized in 1846. Period for convicted prisoners, not exceeding 3 months. Eighth Report, p. 20.

ROXBURGH—*Jedburgh.*—Legalized before the constitution of the General Board. Tenth Report, p. 23.

Hawick.—Legalized in 1844. Certain civil prisoners excepted. Period for convicted prisoners, not exceeding 10 days. Sixth Report, p. 30.

Kelso.—Legalized in 1844 on the same terms as Hawick. Sixth Report, p. 30.

SELKIRK—*Selkirk.*—Legalized in 1866, as altered and enlarged. Twenty-eighth Report, p. 17.

STIRLING—*Stirling.*—Legalized in 1847. Ninth Report, p. 24.

Falkirk.—Discontinued in 1847 as a Prison for convicted prisoners.

SUTHERLAND—*Dornoch.*—Legalized in 1844. Sixth Report, p. 30.

WIGTOWN—*Wigtown.*—Legalized in 1848. Tenth Report, p. 24.

Stranraer.—Legalized in 1848. Tenth Report, p. 24.

ZETLAND—*Fort-Charlotte.*—Legalized in 1845. Seventh Report, p. 22.

POLICE CELLS LICENSED UNDER 'THE SUMMARY PROCEDURE ACT 1864'

(not under County Boards).

Kilsyth, in the County of Stirling.—Police Cells legalized in 1865. Period for convicted prisoners not exceeding 24 hours. Twenty-seventh Report, p. 11.

Lochgilphead, in the County of Argyle.—Old Prison, legalized as a place of imprisonment as Police Cells. Period not exceeding three days. Twenty-eighth Report, p. 17.

Oban, in the county of Argyle.—Police Cells legalized in 1867. Period not exceeding three days. Twenty-ninth Report, p. 16.

THE GENERAL PRISON FOR SCOTLAND AT PERTH,

Declared by the Prisons' Act to be for prisoners sentenced to imprisonment and for such convicts

No. II.—Orders issued by the Secretary of State in the Year 1868, under Section 27 of "The Prisons (Scotland) Administration Act, 1860."

1. *Prison of Dundee.*

The Right Honourable Gathorne Hardy, one of Her Majesty's Most Honourable Privy Council, and Principal Secretary of State, etc. etc. etc.

Whereas, in respect to the *Prison of Dundee*, in the County of Forfar, it has been found proper to re-arrange and alter the Classes of Prisoners for which the several parts thereof are a legal place of detention, in so far that the same contains within the boundary wall thereof Buildings for the following purposes, viz.:—*First*, Five blocks or wings, whereof two blocks contain ninety Cells for Male Criminal Prisoners; two blocks contain fifty-eight Cells for Female Criminal Prisoners, and one Apartment for Female Civil Prisoners; and one block contains seven Apartments for Male Civil Prisoners. *Second*, Punishment Cells, Governor's House, Office, and Store Rooms.

In virtue of the powers contained in the Prisons (Scotland) Administration Act, 1860, I do hereby Order and Intimate that the said Prison of Dundee shall, on and after the twenty-first day of April 1868, be a Legal Prison for the detention of all descriptions of Civil and Criminal Prisoners, but subject, in respect to the middle floor of the second block for Male Criminal Prisoners (being the further of the two from the Governor's Office), to the following condition, viz.:—That the twenty-four Cells, of which the same consists, being of smaller size than the other Cells in the Prison, shall only be a legal place of detention for Prisoners for a period not exceeding fifteen days,—such period to commence with the day on which the Prisoner shall have been received into the Prison, whether such day be before or after his trial.

Given under my hand at Whitehall, the 14th of April 1868, in the thirty-first year of Her Majesty's reign.

Gathorne Hardy.

2. *Prison of Wick.*

The Right Honourable Gathorne Hardy, one of Her Majesty's Most Honourable Privy Council, and Principal Secretary of State, etc. etc. etc.

Whereas the *Prison of Wick* is not a suitable place of detention for Prisoners during the latter portion of long sentences, and it is desirable, without prejudice to the legality of that Prison as a place of detention in other respects, for all descriptions of Civil and Criminal Prisoners, that the period during which Criminal Prisoners under long sentences may be detained therein should be limited:

In virtue of the powers contained in the Prisons (Scotland) Administration Act, 1860, I do hereby Order and Direct that the Prison of Wick, in the County of Caithness, shall, on and after the 1st day of October 1868, Cease to be a Prison for the detention beyond four months from the date of their respective sentences of Criminal Prisoners sentenced to imprisonment, and that The Prison of Aberdeen, in the County of Aberdeen, shall be the Prison to which the Prisoners who cannot be detained in the Prison of Wick by reason of the change made by this Order in the classes of Prisoners for which the same is legal, shall be removed; and further, that the removal of such Prisoners shall be carried out by or under the direction of the Prison Board of the County of Caithness, under the powers conferred on them by the said Act.

Given under my hand and seal, at Whitehall, the thirty-first day of August 1868, in the thirty-second year of Her Majesty's reign.

Gathorne Hardy.

3. *Prison of Aberdeen.*

The Right Honourable Gathorne Hardy, one of Her Majesty's Most Honourable Privy Council, and Principal Secretary of State, etc. etc. etc.

Whereas that part of the *Prison of Aberdeen*, in the County of Aberdeen, which adjoins the street called the Lodge Walk, and has been heretofore commonly called the East Prison, has recently, with the consent of one of Her Majesty's Principal Secretaries of State, been Altered and Enlarged, in so far that the same contains within the boundary wall thereof the following accommodation, viz.:—

Fifty-two Cells for Male Criminal Prisoners, thirty-five Cells for Female Criminal Prisoners, four Association Rooms for Male Criminal Prisoners, two Association Rooms for Female Criminal Prisoners, one Punishment Cell for Male Criminal Prisoners, one Punishment Cell for Female Criminal Prisoners, three Airing Yards for Male Criminal Prisoners, two Airing Yards for Female Criminal Prisoners, one Bath-room for Male Criminal Prisoners, one Bath-room for Female Criminal Prisoners, two Day-rooms for Civil Prisoners, six Night Cells for Civil Prisoners, an Airing Yard for Male Civil Prisoners, an Airing Yard for Female Civil Prisoners, with a Residence for the Governor, Apartments for the use of Warders on duty, a Washhouse, a Laundry, and other necessary Offices.

In virtue of the powers contained in the Prisons (Scotland) Administration Act, 1860, I do hereby order and intimate that the said Building, as so altered and enlarged, shall, on and after the 11th day of January 1869, under the name of the Prison of Aberdeen, be a Legal Prison for the detention of all descriptions of Civil and Criminal Prisoners: Further, that the Building situated in the West Suburbs of the City of Aberdeen, and in the Parish of Old Machar, which has heretofore been called the West Prison, shall, on and after the 18th day of January 1869, Cease to be a legal Prison.

Given under my hand at Whitehall, the ninth day of December 1868.

Gathorne Hardy.

No. III.—Comparative Statement of the Average Daily Number of Criminal Prisoners in the several Prisons in Scotland, in the two quinquennial periods ending 30th June 1861 and 1866, respectively. Also the number in each of the three years ending 30th June 1866, 1867, and 1868. *Compiled from the Reports on Prisons in Scotland.*

	Yearly number on an average in the five years ending		In the years ending		
	30th June 1861.	30th June 1866.	30th June 1866.	30th June 1867.	30th June 1868.
I. Number of Prisoners received in the year,	19,439	24,296	26,005	26,515	27,664
Deduct received by Transference or Removal from one Prison to another,	864	873	899	789	821
II. Total Nett Number of Commitments in the year,	18,575	23,423	25,106	25,726	26,843
III. Ages of the above :—					
Under 16 years,	1,224	1,067	1,061	1,070	1,186
16 and under 18 years,	982	1,071	1,164	1,250	1,303
18 and under 21 years,	2,357	2,875	2,909	2,890	3,289
21 and under 50 years,	12,657	16,319	17,779	18,344	18,876
50 and above,	1,355	2,091	2,193	2,172	2,189
Total,	18,575	23,423	25,106	25,726	26,843
IV. Sentences of Prisoners convicted during the year, viz. :—					
1. To imprisonments for definite periods, viz. :—					
10 days and under,	2,573	3,434	3,535	3,486	3,848
11 days and not above 60 days,	6,728	7,884	8,382	8,370	8,704
Above 60 days and under 6 months,	499	490	391	382	520
6 months and under 1 year,	417	390	385	479	536
1 year and upwards,	265	264	245	323	418
Total imprisonments for definite periods,	10,482	12,412	12,938	13,040	14,026
2. To imprisonment for indefinite periods, viz. :—					
1. Until caution found to keep the peace,	555	502	388	204	251
2. Until or instead of payment of fine or penalty,	4,198	7,893	9,318	9,931	9,568
Total imprisonments periods not definite,	4,753	8,395	9,706	10,235	9,819
3. Juveniles to Whipping without Imprisonment,	88	52	49	86	135
4. To Transportation, viz. :—					
14 years,	2	.....	.....	.....	.....
15 years,	4	.....	.....	.....	.....
21 years,	4	.....	.....	.....	.....
Life,	1	.....	.....	.....	.....
5. To Penal Servitude, viz. :—					
3 years,	19	20	.....	.....	.....
4 years,	105	50	.....	.....	.....
Above 4 years and not above 6 years,	12	.....	.....	.....	.....
5 years,	13	21	31	20	39
6 years,	20	23	.....	.....	.....
7 years,	10	39	94	88	113
8 years,	16	24	19	31	42
9 years,	.....	1	1	.....	.....
10 years,	19	20	22	29	19
12 years,	.....	1	2	.....	2
14 years,	2	.....	1	.....	.....
15 years,	5	4	4	6	6
20 years,	.....	.....	1	1	2
21 years,	4	2	.....	1	.....
Life,	2	2	1	.....	.....
V. Total Sentences to Transportation and to Penal Servitude,	238	207	176	176	223
VI. To Death, including Sentences afterwards commuted,	3	2	4	.....	2
VII. Grand Total of Sentences,	15,564	21,068	22,873	23,537	24,205
VIII. Previous Imprisonments in the same Prison of Prisoners received, viz. :—					
Once,	2,565	3,519	3,867	4,250	4,286
Twice,	1,253	1,759	1,971	2,012	2,094
Thrice,	827	1,124	1,315	1,314	1,371
Four Times,	579	776	901	839	901
Five Times,	435	572	639	623	728
Six Times and under Ten,	924	1,286	1,403	1,397	1,603
Ten Times and under Twenty,	802	1,116	1,159	1,006	1,260
Twenty Times and under Fifty,	515	827	932	930	996
Fifty Times and upwards,	119	279	358	329	335
Total,	8,019	11,258	12,545	12,700	13,574
IX. State as to Instruction of Criminal Prisoners on admission :—					
1. Reading,—Could not read,	3,802	4,845	5,402	5,443	5,539
Read with difficulty,	9,254	12,369	12,796	13,521	14,187
Read well,	4,765	6,191	6,908	6,762	7,117
Total,	17,821	23,405	25,106	25,726	26,843
2. Writing,—Could not write,	8,371	10,771	11,570	11,620	11,914
Could sign name merely,	535	528	469	524	602
Write with difficulty,	7,341	9,674	10,132	11,124	12,352
Write well,	1,574	2,432	2,935	2,458	1,975
Total,	17,821	23,405	25,106	25,726	26,843
Had learned more than mere reading and writing,	273	431	460	511	414
X. Average daily number in confinement,	2,159	2,350	2,391	2,416	2,551

No. IV.

DIGEST of RETURNS from the PRISON BOARDS of the several COUNTIES, and from the GOVERNOR of the GENE the PRISONERS confined therein, for the Period beginning on the **1st Day of July 1867**, immediately

COUNTIES.	PRISONS.	No. of Prison.	1. Extent of Prison Accommodation.								2. In Prison				
			Criminal Department.				Civil Department.				Criminal.				
			Number of Cells or Rooms for Confinement, viz.—				Number of Cells or Rooms for Confinement, viz.—				Total.			Untrie	
			During Night, or Night and Day.		During Day only.		During Night, or Night and Day.		During Day only.						
			M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.	M.	F.
1	Aberdeen	Aberdeen	1	51	39	...	...	7	1	1	...	33	21	54	7	6
		Peterhead	2	3	3	...	...	...	...	...	...	3	1	4	...	...
		Huntly	3	3	...	...	...	...	...	...	...	...	...	...	...	...
		Fraserburgh	4	2	...	...	...	...	...	...	...	...	...	...	...	...
2	Argyle	Inveraray	5	12	9	...	...	4	...	...	...	4	3	7	1	2
		Campbeltown	6	6	3	...	...	1	...	...	...	9	1	10	...	...
		Tobermory	7	3	1	...	...	1	...	...	...	1	...	1	...	...
3	Ayr	Ayr	8	29	112	...	...	2	1	1	...	18	100	118	...	2
		Kilmarnock	9	16	5	...	...	...	...	...	...	9	1	10	4	...
4	Banff	Banff	10	12	4	...	...	3	...	...	...	3	2	5	...	...
		Keith	11	1	1	...	...	...	...	...	...	...	...	...	...	...
5	Berwick	Greenlaw	12	16	3	...	...	2	1	...	...	6	...	6	3	...
		Dunse	13	3	1	...	...	...	...	...	...	...	...	...	...	...
6	Bute	Rothesay	14	13	8	...	...	2	1	...	...	7	1	8	3	...
7	Caithness	Wick	15	7	4	...	...	1	1	...	...	8	3	11	1	1
8	Clackmannan	Alloa	16	14	6	...	1	1	1	...	...	1	6	7	...	...
9	Dumbarton	Dumbarton	17	20	9	...	...	1	...	...	...	15	2	17	4	1
		Kirkintilloch	18	2	1	...	...	...	...	...	...	1	...	1	...	...
		Helensburgh	19	2	1	...	...	...	...	...	...	1	...	1	1	...
10	Dumfries	Dumfries	20	31	14	...	...	1	1	...	...	17	3	20	...	...
11	Edinburgh	Edinburgh, including Court Buildings	21	235	200	...	...	13	2	6	...	166	130	296	18	9
		Musselburgh	22	4	1	...	...	...	...	...	...	1	1	2	...	...
12	Elgin	Elgin	23	13	5	...	...	1	1	1	...	7	2	9	3	1
		Forres	24	3	1	...	...	...	...	...	...	...	...	...	...	...
13	Fife	Cupar	25	34	15	...	...	1	...	...	...	25	3	28	8	1
		Dunfermline	26	13	7	...	...	1	...	...	...	8	1	9	1	...
14	Forfar	Dundee	27	90	58	...	...	6	1	1	...	75	37	112	13	10
		Forfar	28	27	8	...	...	4	...	1	...	22	...	22	7	...
15	Haddington	Haddington	29	12	6	...	...	2	...	...	...	3	3	6	...	...
		Dunbar	30	2	1	...	...	...	...	...	...	2	...	2	...	...
16	Inverness	Inverness	31	20	9	...	...	2	...	...	...	7	12	19	2	5
		Portree	32	3	1	...	...	1	...	...	...	...	...	...	...	...
		Lochmaddy	33	2	1	...	...	1	...	...	...	...	...	...	...	...
		Fort-William	34	6	1	...	...	...	...	...	...	1	...	1	...	...
17	Kincardine	Stonehaven	35	10	3	...	...	1	1	1	1	11	2	13	7	...
18	Kinross	Kinross	36	4	2	...	...	1	1	...	...	...	...	...	...	...
19	Kirkcudbright	Kirkcudbright	37	12	6	2	...	4	...	...	...	5	...	5	1	...
		Maxwelltown	38	3	1	...	...	...	...	...	...	...	...	...	...	...
20	Lanark	Glasgow	39	338	173	3	...	34	2	4	1	294	206	500	34	30
		Lanark	40	18	4	...	...	5	...	1	...	6	2	8	2	...
		Hamilton	41	24	6	...	...	4	...	1	...	19	4	23	5	...
		Airdrie	42	31	12	...	...	3	...	1	...	30	11	41	6	1
21	Linlithgow	Linlithgow	43	20	5	...	...	1	1	...	...	19	2	21	4	...
22	Nairn	Nairn	44	3	2	...	...	1	...	...	...	4	...	4	4	...
23	Orkney	Kirkwall	45	3	2	...	...	1	...	...	...	1	...	1	1	...
24	Peebles	Peebles	46	11	...	...	...	1	...	1	...	1	...	1	...	...
25	Perth	Perth	47	30	17	2	1	1	1	...	...	26	5	31	4	...
		Perth Police Cells	48	4	3	...	...	...	...	...	...	2	3	5	2	3
		Dunblane	49	7	2	...	...	1	...	...	...	5	2	7	2	...
26	Renfrew	Paisley	50	89	53	1	1	2	1	...	...	58	52	110	7	3
		Greenock	51	23	10	...	...	...	...	...	...	13	16	29	6	2
		Pollockshaws	52	2	2	...	...	...	...	...	...	...	...	...	...	...
27	Ross and Cromarty	Dingwall	53	9	9	...	...	1	...	...	...	*2	1	3	*1	1
		Tain	54	4	1	...	...	1	1	...	...	...	1	1	...	...
		Cromarty	55	3	...	...	...	1	...	...	...	...	...	...	...	...
		Stornoway	56	5	...	...	...	1	...	...	...	...	...	...	...	...
28	Roxburgh	Jedburgh	57	34	8	...	...	2	...	...	...	6	...	6	2	...
		Hawick	58	4	...	...	...	...	...	...	...	...	...	...	...	...
		Kelso	59	4	...	...	...	...	...	...	...	...	...	...	...	...
29	Selkirk	Selkirk	60	7	3	...	...	1	...	...	...	7	1	8	4	...
30	Stirling	Stirling	61	33	15	1	3	2	1	...	...	37	16	53	9	2
		Falkirk	62	1	1	...	...	...	...	...	...	2	...	2	2	...
31	Sutherland	Dornoch	63	8	4	...	...	1	1	...	...	2	...	2	1	...
32	Wigtown	Wigtown	64	6	2	...	...	1	...	...	...	2	3	5	...	...
		Stranraer	65	6	6	...	...	1	1	...	...	...	1	1	...	1
33	Zetland	Fort-Charlotte	66	6	...	...	...	1	...	...	...	1	...	1	...	...
25	Perth	General Prison	67	365	382	5	7	...	...	...	...	373	361	734	27	8
				1,837	1,272	14	18	131	22	20	2	1,379	1,022	2,401	207	89

* The Governor of Dingwall Prison was incorrect in returning 2

ACCOMMODATION AND NUMBERS.

No. IV.

RISON for SCOTLAND at PERTH, relative to the ACCOMMODATION in the several Prisons throughout Scotland, and to idnight of the preceding Day, and ending on the **30th day of June 1868**, at Midnight of that Day.

mmencement of the Period.						3. Number received during the Period.									4. Total Number in Confinement during the Period, including Cases of Recommitment.						5. Number removed during the Period to other Prisons for detention.				
						Criminal.						Civil.			Criminal.			Civil.			Criminal.				
Convicted.			Civil.			Including Cases of Recommitment within the year.			Not including Cases of Recommitment of the same Prisoner within the year.												(1.) In Prison at Commencement of the Period.		(2.) Received during the Period.		
M.	F.	Total.	M.	F.	Tot.	M.	F.	Total.	M.	F.	Total.	M.	F.	Tot.	M.	F.	Total.	M.	F.	Tot.	M.	F.	M.	F.	
26	15	41	3	1	4	624	353	977	516	241	757	56	2	58	657	374	1031	59	3	62	6	1	8	13	
3	1	4	...	...	...	61	26	87	56	23	79	...	...	...	64	27	91	...	...	...	...	...	3	3	
...	...	...	...	...	...	13	3	16	13	3	16	...	...	...	13	3	16	...	...	...	...	...	1	...	
...	...	...	...	...	...	24	10	34	22	9	31	...	...	...	24	10	34	...	...	...	...	...	4	...	
3	1	4	1	...	1	94	29	123	89	28	117	5	...	5	98	32	130	6	...	6	...	...	3	1	
9	1	10	1	...	1	62	26	88	59	25	84	3	...	3	71	27	98	4	...	4	...	...	2	...	
1	...	1	...	...	...	13	3	16	13	3	16	...	...	...	14	3	17	...	...	...	...	...	1	...	
18	98	116	...	...	...	363	207	570	333	159	492	27	...	27	381	307	688	27	...	27	...	41	10	3	
5	1	6	...	...	...	123	40	163	89	28	117	...	...	...	132	41	173	...	...	...	...	...	5	3	
3	2	5	2	...	2	58	30	88	58	31	89	8	1	9	61	32	93	10	1	11	1	2	1	2	1
...	...	...	...	...	...	3	...	3	3	...	3	...	...	...	3	...	3	...	...	...	...	...	...	...	1
3	...	3	...	...	...	88	25	113	83	23	106	6	...	6	94	25	119	6	...	6	...	...	1	1	1
...	...	...	...	...	...	16	2	18	16	2	18	...	...	...	16	2	18	...	...	...	...	...	7	2	1
4	1	5	...	...	...	112	21	133	108	21	129	4	...	4	119	22	141	4	...	4	2	...	7	1	1
7	2	9	2	...	2	52	6	58	49	6	55	12	...	12	60	9	69	14	...	14	3	...	5	...	1
1	6	7	...	...	...	74	41	115	71	35	106	5	...	5	75	47	122	5	...	5	...	...	...	...	1
11	1	12	2	...	2	247	67	314	233	62	295	10	...	10	262	69	331	12	...	12	1	...	3	1	1
1	...	1	...	...	...	28	15	43	27	12	39	...	...	...	29	15	44	...	...	...	...	...	1	4	1
...	...	...	...	...	...	24	18	42	23	16	39	...	...	...	25	18	43	...	...	...	...	...	6	3	1
17	3	20	3	...	3	305	114	419	267	89	356	19	...	19	322	117	439	22	...	22	...	...	3	2	2
148	121	269	9	1	10	2471	3353	5824	2083	1645	3728	83	7	90	2637	3483	6120	92	8	100	31	6	66	28	2
1	1	2	...	...	...	39	17	56	39	17	56	...	...	...	40	18	58	...	...	...	...	...	7	3	2
4	1	5	1	...	1	114	29	143	106	24	130	9	...	9	121	31	152	10	...	10	...	...	4	...	2
...	...	...	...	...	...	16	2	18	12	2	14	...	...	...	16	2	18	...	...	...	...	...	...	...	2
17	2	19	...	...	...	258	106	364	246	101	347	13	...	13	283	109	392	13	...	13	...	...	...	2	2
7	1	8	2	...	2	147	64	211	137	59	196	6	...	6	155	65	220	8	...	8	...	...	1	2	2
62	27	89	...	...	...	951	705	1656	742	428	1170	25	4	29	1026	742	1768	25	4	29	9	7	35	15	2
15	...	15	2	1	3	194	43	237	184	39	223	27	...	27	216	43	259	29	1	30	2	...	2	...	2
3	3	6	...	...	...	184	49	233	168	38	206	8	...	8	187	52	239	8	...	8	...	...	2	1	2
2	...	2	...	...	...	34	10	44	31	6	37	...	...	...	36	10	46	...	...	...	...	...	5	3	3
5	7	12	1	...	1	129	51	180	120	41	161	15	2	17	136	63	199	16	2	18	3	2	1	1	3
...	...	...	...	...	...	9	1	10	9	1	10	1	...	1	9	1	10	1	...	1	...	...	...	...	3
...	...	...	...	...	...	19	2	21	17	2	19	...	...	...	19	2	21	...	...	...	...	...	...	...	3
1	...	1	...	...	...	23	5	28	23	5	28	...	...	...	24	5	29	...	...	...	...	...	1	...	3
4	2	6	1	...	1	71	19	90	67	17	84	4	1	5	82	21	103	5	1	6	2	...	...	...	3
...	...	...	...	...	...	42	4	46	39	4	43	1	...	1	42	4	46	1	...	1	...	...	1	...	3
4	...	4	2	...	2	48	13	61	44	13	57	5	1	6	58	13	66	7	1	8	1	...	...	...	3
...	...	...	...	...	...	20	10	30	19	10	29	...	...	...	20	10	30	...	...	...	...	...	...	...	3
260	176	436	13	1	14	4381	2832	7213	2453	1895	4348	187	11	198	4675	3038	7713	200	12	212	42	13	97	66	3
4	2	6	1	...	1	129	24	153	93	21	114	4	...	4	135	26	161	5	...	5	...	...	1	...	4
14	4	18	3	...	3	467	94	561	429	64	493	7	...	7	486	96	584	10	...	10	...	...	1	...	4
24	10	34	1	...	1	771	229	1000	498	121	619	16	...	16	801	240	1041	17	...	17	2	...	...	...	4
15	2	17	...	...	...	234	49	283	229	45	274	3	...	3	253	51	304	3	...	3	...	...	...	...	4
...	...	...	...	...	...	59	14	73	56	14	70	3	...	3	63	14	77	3	...	3	...	...	1	1	4
...	...	...	...	...	...	14	7	21	13	6	19	8	...	8	15	7	22	8	...	8	...	...	...	...	4
1	...	1	...	...	...	92	14	106	87	14	101	6	...	6	93	14	107	6	...	6	...	...	...	...	4
22	5	27	1	...	1	348	219	567	302	158	460	17	1	18	374	224	598	18	1	19	3	...	11	4	4
...	...	...	...	...	...	14	13	27	14	13	27	...	...	...	16	16	32	...	...	...	...	...	...	...	4
3	2	5	...	...	...	115	28	143	113	27	140	...	...	...	120	30	150	...	...	...	...	...	5	3	4
51	49	100	2	...	2	700	471	1171	653	336	989	41	3	44	758	523	1281	43	3	46	5	3	19	16	5
7	14	21	...	...	...	728	520	1248	603	313	916	...	...	...	741	536	1277	...	...	...	4	2	92	58	5
...	...	...	...	...	...	120	15	135	113	15	128	...	...	...	120	15	135	...	...	...	...	...	24	2	5
*1	...	1	1	...	1	32	6	38	31	5	36	5	...	5	34	7	41	6	...	6	...	...	...	...	5
...	1	1	...	...	...	33	5	38	31	5	36	4	...	4	33	6	39	4	...	4	...	...	...	...	5
...	...	...	...	...	...	6	1	7	5	1	6	2	...	2	6	1	7	2	...	2	...	...	1	...	5
...	...	...	...	...	...	36	5	41	36	5	41	...	...	...	36	5	41	...	...	...	...	...	...	1	6
4	...	4	...	...	...	199	22	221	172	21	193	5	1	6	205	22	227	5	1	6	1	...	5	2	5
...	...	...	...	...	...	52	15	67	50	13	63	...	...	...	52	15	67	...	...	...	...	...	9	3	5
...	...	...	...	...	...	24	5	29	22	5	27	...	...	...	24	5	29	...	...	...	...	...	14	3	5
3	1	4	...	...	...	107	17	124	85	17	102	4	...	4	114	18	132	4	...	4	...	...	1	...	6
28	14	42	6	1	7	546	246	792	506	197	703	16	1	17	588	262	845	22	2	24	1	...	11	1	6
...	...	...	...	...	...	81	29	110	75	27	102	...	...	...	83	29	112	...	...	...	1	...	56	15	6
1	...	1	...	...	...	31	3	34	30	3	33	2	...	2	33	3	36	2	...	2	...	...	...	...	6
2	3	5	1	...	1	44	11	55	42	11	53	2	...	2	46	14	60	3	...	3	...	...	2	1	6
...	...	...	...	...	...	54	13	67	52	13	65	2	...	2	54	14	68	2	...	2	...	...	...	...	6
1	...	1	...	...	...	56	17	73	55	16	71	1	...	1	57	17	74	1	...	1	...	...	3	2	6
346	353	699	...	...	...	394	201	595	394	201	595	...	...	...	767	562	1829	...	...	...	...	2	...	...	6
572	933	2,105	61	5	66	17,020	10,644	27,664	13,456	6,850	20,306	687	35	722	18,399	11,666	30,065	748	40	788	120	79	549	272	
																					199		821		

e prisoners as in confinement at the end of the period in last year's Return.

(No. IV. *Continued.*) DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND,

	COUNTIES.	PRISONS.	No. of Prison.	6. Average duration of Confinement of each Criminal Prisoner.	7. Average daily Number in Confinement during the Period.						8. Average daily Number of Crim the Four Quarters,					
					Criminal.			Civil.			30th September 1867.			31st December 1867.		
				Days.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
1	Aberdeen	Aberdeen	1	21	42	18	60	5	...	5	41	19	60	44	16	
		Peterhead	2	20	3	2	5	...	...	...	3	2	5	4	1	
		Huntly	3	...	...	...	...	...	...	...	...	...	...	...	...	
		Fraserburgh	4	...	...	...	...	...	...	...	1	...	1	...	...	
2	Argyle	Inveraray	5	23	6	2	8	1	...	1	4	2	6	6	3	
		Campbeltown	6	34	7	2	9	...	...	...	5	2	7	10	1	
		Tobermory	7	...	...	...	...	...	...	...	...	...	...	1	...	
3	Ayr	Ayr	8	65	27	96	123	5	...	5	30	99	129	24	96	1
		Kilmarnock	9	23	8	3	11	...	...	...	9	2	11	9	3	
4	Banff	Banff	10	31	5	3	8	1	...	1	3	2	5	5	4	
		Keith	11	...	...	...	...	...	...	...	...	...	...	...	...	
5	Berwick	Greenlaw	12	34	8	3	11	...	...	...	8	2	10	10	4	
		Dunse	13	...	...	...	...	...	...	...	...	...	...	1	...	
6	Bute	Rothesay	14	23	8	1	9	...	...	...	7	1	8	5	1	
7	Caithness	Wick	15	27	4	1	5	1	...	1	5	1	6	4	1	
8	Clackmannan	Alloa	16	27	6	3	9	...	...	...	2	4	6	5	3	
9	Dumbarton	Dumbarton	17	20	15	3	18	...	...	...	17	3	20	14	2	
		Kirkintilloch	18	...	...	...	...	...	...	...	...	...	...	...	...	
		Helensburgh	19	...	...	...	...	...	...	...	1	...	1	...	...	
10	Dumfries	Dumfries	20	19	18	5	23	1	...	1	17	7	24	13	3	
11	Edinburgh	Edinburgh, including Court Buildings	21	21	164	189	353	9	2	11	177	218	395	154	193	3
		Musselburgh	22	6	1	...	1	...	...	...	2	1	3	...	...	
12	Elgin	Elgin	23	24	8	2	10	1	...	1	6	1	7	10	1	
		Forres	24	...	...	...	...	...	...	...	...	...	...	1	...	
13	Fife	Cupar	25	26	21	7	28	1	...	1	23	10	33	17	9	
		Dunfermline	26	22	9	4	13	1	...	1	8	2	10	9	3	
14	Forfar	Dundee	27	21	66	35	101	2	...	2	69	40	109	61	38	
		Forfar	28	31	19	3	22	4	...	4	14	1	15	15	3	
15	Haddington	Haddington	29	20	12	2	14	1	...	1	9	2	11	10	3	
		Dunbar	30	...	...	...	...	...	...	...	...	...	...	...	...	
16	Inverness	Inverness	31	24	8	5	13	...	...	...	6	6	12	8	6	
		Portree	32	...	...	...	...	...	...	...	...	...	...	...	...	
		Lochmaddy	33	17	1	...	1	...	...	...	...	...	...	2	...	
		Fort-William	34	13	1	...	1	...	...	...	1	...	1	1	...	
17	Kincardine	Stonehaven	35	32	7	2	9	1	...	1	8	2	10	8	2	
18	Kinross	Kinross	36	24	3	...	3	...	...	...	3	...	3	3	...	
19	Kirkcudbright	Kirkcudbright	37	28	4	1	5	...	...	...	5	1	6	4	2	
		Maxwelltown	38	...	...	...	...	...	...	...	...	...	...	...	...	
20	Lanark	Glasgow	39	25	355	179	534	16	1	17	329	211	540	350	186	5
		Lanark	40	27	10	2	12	...	...	...	9	4	13	13	2	
		Hamilton	41	17	22	5	27	3	...	3	19	3	22	26	5	
		Airdrie	42	13	29	9	38	1	...	1	30	10	40	25	10	
21	Linlithgow	Linlithgow	43	28	20	3	23	1	...	1	15	4	19	23	3	
22	Nairn	Nairn	44	19	3	1	4	...	...	...	3	...	3	3	...	
23	Orkney	Kirkwall	45	...	...	...	...	...	...	...	...	...	...	1	...	
24	Peebles	Peebles	46	17	5	...	5	...	...	...	2	1	3	5	...	
25	Perth	Perth	47	31	35	15	50	2	...	2	29	13	42	41	18	
		Perth Police Cells	48	12	1	...	1	...	...	...	1	...	1	...	...	
		Dunblane	49	15	4	2	6	...	...	...	6	3	9	5	1	
26	Renfrew	Paisley	50	33	62	55	117	4	...	4	61	55	116	61	56	1
		Greenock	51	9	17	13	30	...	...	...	17	13	30	14	13	
		Pollockshaws	52	3	1	...	1	...	...	...	1	1	2	1	...	
27	Ross and Cromarty	Dingwall	53	36	3	1	4	...	...	...	2	1	3	3	2	
		Tain	54	19	1	1	2	...	...	...	2	1	3	1	1	
		Cromarty	55	...	...	...	...	...	...	...	...	...	...	...	...	
		Stornoway	56	18	2	...	2	...	...	...	1	...	1	2	...	
28	Roxburgh	Jedburgh	57	21	12	1	13	...	...	...	10	1	11	9	...	
		Hawick	58	5	1	...	1	...	...	...	1	...	1	...	...	
		Kelso	59	...	...	...	...	...	...	...	...	...	...	...	...	
29	Selkirk	Selkirk	60	17	5	1	6	...	...	...	5	1	6	5	1	
30	Stirling	Stirling	61	23	39	13	52	3	...	3	41	14	55	35	12	
		Falkirk	62	3	1	...	1	...	...	...	1	...	1	1	...	
31	Sutherland	Dornoch	63	20	2	...	2	...	...	...	1	...	1	1	1	
32	Wigtown	Wigtown	64	24	3	1	4	...	...	...	1	1	2	2	...	
		Stranraer	65	27	4	1	5	1	...	1	2	1	3	4	1	
33	Zetland	Fort-Charlotte	66	15	2	1	3	...	...	...	2	...	2	2	1	
25	Perth	General Prison	67	202	378	357	735	...	...	...	377	350	727	373	356	7
				31	1,498	1,053	2,551	65	3	68	1,452	1,118	2,570	1,464	1,069	2,5

for the Year ended on the 30th day of June 1868—*continued.* (No. IV. *Continued.*)

oners during each of ending					9. Number at the end of the Period, viz., at midnight on 30th June 1868.												10. Greatest number of Criminals, Males and Females, respectively, at any one time, viz.—		No. of Prison.
					Criminal.									Civil.					
31st March 1868.		30th June 1868.			Total.			Untried.			Convicted.								
F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M	F.	T.	M.	F.	
18	56	43	20	63	34	13	47	2	3	5	32	10	42	6	...	6	51	25	1
2	5	2	2	4	2	1	3	...	1	1	2	...	2	...	...	...	7	5	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	3
...	...	...	...	...	1	...	1	...	...	...	1	...	1	...	...	...	2	2	4
2	8	7	2	9	5	1	6	1	1	2	4	...	4	...	...	...	11	5	5
3	11	6	3	9	8	5	13	2	2	4	6	3	9	...	...	...	14	9	6
...	...	...	...	...	1	...	1	1	...	1	...	...	...	...	...	...	3	1	7
100	129	24	91	115	30	101	131	1	...	1	29	101	130	6	...	6	40	111	8
4	14	5	3	8	8	3	11	1	2	3	7	1	8	...	...	...	16	10	9
4	10	5	2	7	7	3	10	2	...	2	5	3	8	1	...	1	9	7	10
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	11
2	11	7	2	9	7	1	8	3	...	3	4	1	5	...	...	...	17	6	12
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	13
...	10	11	1	12	8	1	9	1	...	1	7	1	8	1	...	1	14	3	14
1	4	3	1	4	5	1	6	1	...	1	4	1	5	2	...	2	8	3	15
4	11	8	2	10	10	...	10	5	...	5	5	...	5	...	...	...	11	10	16
4	16	15	3	18	19	6	25	5	...	5	14	6	20	...	...	...	23	6	17
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	3	18
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	3	19
2	21	23	7	30	34	9	43	3	...	3	31	9	40	1	...	1	35	12	20
175	336	167	170	337	178	113	291	29	12	41	149	101	250	11	2	13	216	299	21
...	1	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	6	4	22
3	13	7	3	10	5	5	10	2	...	2	3	5	8	...	...	...	15	5	23
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	24
5	24	23	6	29	22	3	25	3	1	4	19	2	21	3	...	3	31	14	25
6	14	10	3	13	8	2	10	...	...	...	8	2	10	...	...	...	17	10	26
33	103	64	30	94	65	28	93	11	6	17	54	22	76	4	...	4	89	49	27
5	28	23	2	25	25	6	31	9	4	13	16	2	18	4	...	4	32	7	28
2	15	16	1	17	12	1	13	3	...	3	9	1	10	1	...	1	26	6	29
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	2	30
3	12	9	5	14	13	3	16	1	...	1	12	3	15	2	1	3	13	12	31
...	1	...	...	...	1	...	1	1	...	1	...	...	...	...	...	...	2	1	32
...	2	3	...	3	3	...	3	2	...	2	1	...	1	...	...	...	5	1	33
1	1	1	...	1	1	...	1	...	...	...	1	...	1	...	...	...	4	5	34
2	11	4	1	5	2	1	3	...	...	...	2	1	3	...	...	...	13	4	35
...	4	3	...	3	3	...	3	...	...	...	3	...	3	...	...	...	8	1	36
1	7	1	...	1	3	...	3	...	...	...	3	...	3	1	...	1	10	3	37
...	...	...	...	...	...	1	1	...	...	...	...	1	1	...	...	...	2	2	38
147	523	367	169	536	377	183	560	74	39	113	303	144	447	22	...	22	404	238	39
2	13	7	2	9	13	3	16	3	1	4	10	2	12	1	...	1	17	5	40
5	26	20	7	27	26	7	33	2	...	2	24	7	31	1	...	1	36	11	41
8	43	24	10	34	24	2	26	2	...	2	22	2	24	1	...	1	47	16	42
3	22	21	4	25	22	1	23	3	...	3	19	1	20	...	...	...	35	6	43
2	4	3	...	3	4	1	5	1	...	1	3	1	4	...	...	...	9	5	44
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	2	45
...	11	5	...	5	3	1	4	...	1	1	3	...	3	1	...	1	15	3	46
15	50	37	13	50	41	19	60	6	...	6	35	19	54	4	1	5	50	27	47
...	...	...	...	...	1	1	2	1	1	2	...	...	...	...	...	...	2	2	48
1	3	4	2	6	10	4	14	8	1	9	2	3	5	...	...	...	12	6	49
57	118	66	53	119	58	55	113	11	10	21	47	45	92	4	1	5	81	66	50
11	27	20	18	38	18	19	37	5	2	7	13	17	30	...	...	...	43	25	51
...	1	2	...	2	2	...	2	2	...	2	...	...	...	...	...	...	9	1	52
2	6	2	...	2	3	...	3	1	...	1	2	...	2	...	...	...	6	3	53
...	1	1	...	1	1	...	1	1	...	1	...	...	...	...	...	...	5	2	54
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	55
...	2	1	...	1	1	...	1	...	...	...	1	...	1	...	...	...	6	1	56
1	16	13	2	15	13	...	13	1	...	1	12	...	12	2	...	2	25	4	57
...	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	6	3	58
...	...	...	...	...	1	...	1	...	...	...	1	...	1	...	...	...	4	1	59
...	7	5	...	5	3	1	4	...	1	1	3	...	3	...	...	...	12	3	60
13	48	43	14	57	37	20	57	6	...	6	31	20	51	5	...	5	54	20	61
1	2	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	5	3	62
...	2	1	...	1	3	...	3	3	...	3	...	...	...	1	...	1	6	2	63
1	7	4	...	4	4	...	4	...	...	...	4	...	4	...	...	...	8	2	64
1	9	4	2	6	4	2	6	...	...	...	4	2	6	...	...	...	12	4	65
1	4	2	1	3	2	1	3	...	...	...	2	1	3	...	...	...	23	4	66
362	743	381	357	738	376	354	730	30	11	41	346	343	689	...	...	...	388	376	67
1,015	2,567	1,527	1,014	2,541	1,567	982	2,549	249	99	348	1,318	883	2,201	85	5	90			

(No. IV. *Continued.*) DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND

COUNTIES.	PRISONS.	No. of Prison.	11. Greatest Number, including both Sexes, at any one time.						12. Least Number, including both Sexes, at any one time.					
			Criminal.			Civil.			Criminal.			Civil.		
			M.	F.	T.	M.	F	T.	M.	F.	T.	M.	F	T.
1 Aberdeen	Aberdeen	1	50	22	72	13	...	13	34	13	47	...	...	...
	Peterhead	2	5	4	9	...	...	...	1	1	2	...	...	...
	Huntly	3	2	...	2	...	...	...	...	...	...	...	...	...
	Fraserburgh	4	2	1	3	...	...	...	...	...	...	...	...	...
2 Argyle	Inveraray	5	11	4	15	2	...	2	1	1	2	...	...	...
	Campbeltown	6	11	9	20	2	...	2	1	...	1	...	...	...
	Tobermory	7	2	1	3	...	...	...	...	...	...	...	...	...
3 Ayr	Ayr	8	32	111	143	9	...	9	17	88	105	...	...	...
	Kilmarnock	9	15	8	23	...	...	...	2	1	3	...	...	...
4 Banff	Banff	10	8	7	15	3	...	3	1	2	3	1	...	1
	Keith	11	1	...	1	...	...	...	...	...	...	...	...	...
5 Berwick	Greenlaw	12	15	6	21	2	...	2	2	1	3	...	...	...
	Dunse	13	2	1	3	...	...	...	...	...	...	...	...	...
6 Bute	Rothesay	14	14	...	14	1	...	1	2	...	2	...	...	...
7 Caithness	Wick	15	8	3	11	3	...	3	...	1	1	...	...	...
8 Clackmannan	Alloa	16	11	9	20	3	...	3	1	1	2	...	...	...
9 Dumbarton	Dumbarton	17	23	4	27	3	...	3	7	1	8	...	...	...
	Kirkintilloch	18	3	2	5	...	...	...	...	...	...	...	...	...
	Helensburgh	19	4	1	5	...	...	...	...	...	...	...	...	...
10 Dumfries	Dumfries	20	35	9	44	5	...	5	8	...	8	...	...	...
11 Edinburgh	Edinburgh, including Court Buildings	21	183	298	481	16	3	19	147	116	263	2	...	2
	Musselburgh	22	5	2	7	...	...	...	...	...	...	...	...	...
12 Elgin	Elgin	23	14	4	18	3	...	3	2	1	3	...	...	...
	Forres	24	2	...	2	...	...	...	...	...	...	...	...	...
13 Fife	Cupar	25	24	14	38	3	...	3	14	4	18	...	...	...
	Dunfermline	26	16	4	20	3	...	3	7	1	8	...	...	...
14 Forfar	Dundee	27	79	48	127	6	...	6	49	28	77	...	...	...
	Forfar	28	30	7	37	5	...	5	9	...	9	...	...	...
15 Haddington	Haddington	29	26	1	27	2	...	2	2	2	4	...	...	...
	Dunbar	30	2	2	4	...	...	...	...	...	...	...	...	...
16 Inverness	Inverness	31	17	12	19	2	2	4	7	1	8	...	...	...
	Portree	32	1	1	2	1	...	1	...	...	...	...	...	...
	Lochmaddy	33	5	...	5	...	...	...	...	...	...	...	...	...
	Fort-William	34	4	1	5	...	...	...	...	...	...	...	...	...
17 Kincardine	Stonehaven	35	11	2	13	2	...	2	1	1	2	...	...	...
18 Kinross	Kinross	36	8	1	9	1	...	1	...	...	...	...	...	...
19 Kirkcudbright	Kirkcudbright	37	10	1	11	2	...	2	1	...	1	...	...	...
	Maxwelltown	38	2	...	2	...	...	...	...	...	...	...	...	...
20 Lanark	Glasgow	39	364	227	591	27	1	28	355	122	477	9	1	10
	Lanark	40	16	4	20	1	...	1	4	1	5	...	...	...
	Hamilton	41	36	7	43	5	...	5	12	2	14	1	...	1
	Airdrie	42	47	11	58	6	...	6	13	7	20	...	...	...
21 Linlithgow	Linlithgow	43	33	5	38	2	...	2	11	1	12	1	...	1
22 Nairn	Nairn	44	9	...	9	2	...	2	...	...	...	...	...	...
23 Orkney	Kirkwall	45	3	...	3	2	...	2	...	...	...	...	...	...
24 Peebles	Peebles	46	15	1	16	2	...	2	1	...	1	...	...	...
25 Perth	Perth	47	50	22	72	6	1	7	21	12	33	1	...	1
	Perth Police Cells	48	1	2	3	...	...	...	...	...	...	...	...	...
	Dunblane	49	12	6	18	...	...	...	...	...	...	...	...	...
26 Renfrew	Paisley	50	80	59	139	9	...	9	42	50	99	1	...	1
	Greenock	51	39	21	60	...	...	...	7	8	15	...	...	...
	Pollockshaws	52	9	...	9	...	...	...	...	...	...	...	...	...
27 Ross & Cromarty	Dingwall	53	6	2	8	2	...	2	...	...	...	...	...	...
	Tain	54	5	2	7	2	...	2	...	...	...	...	...	...
	Cromarty	55	2	...	2	2	...	2	...	...	...	...	...	...
	Stornoway	56	6	1	7	...	...	...	...	...	...	...	...	...
28 Roxburgh	Jedburgh	57	25	1	26	2	...	2	2	...	2	...	...	...
	Hawick	58	6	...	6	...	...	...	...	...	...	...	...	...
	Kelso	59	1	1	2	...	...	...	...	...	...	...	...	...
29 Selkirk	Selkirk	60	12	2	14	1	...	1	2	1	3	...	...	...
30 Stirling	Stirling	61	54	19	73	6	1	7	26	7	33	...	...	...
	Falkirk	62	3	3	6	...	...	...	1	1	2	...	...	...
31 Sutherland	Dornoch	63	6	1	7	2	...	2	1	...	1	...	...	...
32 Wigtown	Wigtown	64	8	2	10	1	...	1	...	...	...	...	...	...
	Stranraer	65	12	2	14	1	...	1	1	1	2	...	...	...
33 Zetland	Fort-Charlotte	66	23	...	23	1	...	1	...	...	...	...	...	...
25 Perth	General Prison	67	382	376	758	...	...	...	342	345	687	...	...	...

r the Year ended on the **30th day of June 1868**—*continued.* (No. IV. *Continued.*)

13. Separation of Criminal Prisoners. Estimated Average daily Number.								14. Ages of Criminal Prisoners recorded on Admission during the same period (those removed, as per No. (2) of No. 5, being recorded only in the Prison of Detention).										No. of Prison.
In separate Confinement.		Not in separate Confinement but under immediate and constant Superintendence.			Neither in separate Confinement nor under immediate and constant Superintendence.			Under 16 Years.		16 Years and under 18.		18 Years and under 21.		21 Years and under 50.		50 Years and above.		Total.		
F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
16	56	...	...	...	2	2	4	53	15	32	21	55	16	427	233	49	55	616	340	1
2	5	...	...	...	...	...	...	10	3	7	1	7	2	33	13	1	4	58	23	2
...	...	...	...	...	...	...	...	2	...	...	2	2	...	3	1	5	...	12	3	3
...	...	...	...	...	...	...	...	...	...	1	...	...	...	18	5	1	5	20	10	4
2	8	...	...	...	...	...	...	6	1	2	1	12	1	67	21	4	4	91	28	5
1	6	2	1	3	...	...	...	5	2	2	1	6	5	41	14	6	4	60	26	6
...	...	...	...	...	...	...	...	3	1	...	...	2	...	7	1	...	1	12	3	7
78	101	...	...	...	4	18	22	22	11	11	7	27	18	265	147	28	21	353	204	8
3	11	...	...	...	...	...	...	2	6	2	...	17	3	91	21	6	7	118	37	9
3	8	...	...	...	...	...	...	6	3	2	4	9	4	37	15	3	2	57	28	10
...	...	...	...	...	...	...	...	...	...	...	...	1	...	2	...	...	...	3	...	11
3	11	...	...	...	...	...	...	10	...	6	...	4	...	57	22	10	2	87	24	12
...	...	...	...	...	...	...	...	3	...	1	...	...	...	5	...	...	...	9	...	13
1	9	...	...	...	...	...	...	5	1	3	...	14	...	75	11	8	8	105	20	14
1	5	...	...	...	...	...	...	1	...	7	...	8	...	29	5	2	1	47	6	15
3	9	...	...	...	...	...	...	6	1	2	2	3	7	51	26	12	5	74	41	16
3	18	...	...	...	...	...	...	36	4	10	3	27	1	158	50	13	8	244	66	17
...	...	...	...	...	...	...	...	...	...	1	1	2	...	22	8	2	2	27	11	18
...	...	...	...	...	...	...	...	2	...	...	1	2	...	10	12	4	2	18	15	19
5	23	...	...	...	...	...	...	13	3	17	1	33	8	199	83	40	17	302	112	20
84	234	...	...	...	14	105	119	115	30	111	88	280	458	1656	2597	243	152	2405	3325	21
...	...	1	...	1	...	...	...	3	...	...	...	3	...	21	10	5	4	32	14	22
2	10	...	...	...	...	...	...	8	2	5	2	17	2	72	17	8	6	110	29	23
...	...	...	...	...	...	...	...	10	...	...	...	...	...	6	1	...	1	16	2	24
7	28	...	...	...	...	...	...	29	2	10	5	27	7	173	76	19	14	258	104	25
4	13	...	...	...	...	...	...	5	1	3	1	17	5	103	33	18	22	146	62	26
29	95	...	6	6	...	...	...	116	8	78	32	99	59	541	537	82	54	916	690	27
3	21	1	...	1	...	...	...	14	2	8	2	24	1	132	29	14	9	192	43	28
2	14	...	...	...	...	...	...	6	...	12	4	29	3	123	26	12	15	182	48	29
...	...	...	...	...	...	...	...	8	...	3	...	5	1	12	5	1	1	29	7	30
5	13	...	...	...	...	...	...	21	...	5	2	18	8	72	30	12	10	128	50	31
...	...	...	...	...	...	...	...	3	...	...	1	1	...	4	...	1	...	9	1	32
...	1	...	...	...	...	...	...	...	...	...	...	4	...	13	2	2	...	19	2	33
...	1	...	...	...	...	...	...	1	...	1	1	...	...	19	3	1	1	22	5	34
2	9	...	...	...	...	...	...	5	1	6	...	8	3	48	13	4	2	71	19	35
...	3	...	...	...	...	...	...	2	...	6	...	4	...	23	1	6	3	41	4	36
1	5	...	...	...	...	...	...	2	...	...	2	4	2	41	8	1	1	48	13	37
...	...	...	...	...	...	...	...	1	...	...	...	2	...	16	7	1	3	20	10	38
96	405	20	67	87	26	16	42	191	41	347	131	713	422	2767	1981	266	191	4284	2766	39
2	12	...	...	...	...	...	...	7	...	4	...	14	...	91	21	12	3	128	24	40
3	21	4	2	6	...	...	...	10	3	18	3	62	8	338	77	38	3	466	94	41
6	31	4	3	7	...	...	...	46	12	13	8	73	11	579	169	60	29	771	229	42
3	18	5	...	5	...	...	...	7	3	4	1	32	2	167	35	24	8	234	49	43
1	4	...	...	...	...	...	...	5	...	10	2	2	...	35	11	6	...	58	13	44
...	...	...	...	...	...	...	...	3	...	2	1	4	...	4	3	1	3	14	7	45
...	5	...	...	...	...	...	...	7	...	5	1	6	1	56	11	18	1	92	14	46
15	40	10	...	10	...	...	...	19	4	21	4	40	12	241	182	16	13	337	215	47
...	1	...	...	...	...	...	...	1	...	...	...	...	...	8	10	5	3	14	13	48
...	...	4	2	6	...	...	...	5	...	5	1	20	1	71	18	9	5	110	25	49
45	103	4	10	14	...	...	...	27	4	33	9	69	56	510	335	42	51	681	455	50
5	19	3	8	11	...	...	...	22	7	16	13	39	38	511	368	48	36	636	462	51
...	1	...	...	...	...	...	...	5	...	12	...	21	...	55	12	3	1	96	13	52
1	4	...	...	...	...	...	...	3	1	2	1	4	...	22	3	1	1	32	6	53
1	2	...	...	...	...	...	...	6	1	3	1	5	...	16	3	3	...	33	5	54
...	...	...	...	...	...	...	...	2	1	...	...	2	...	...	...	1	...	5	1	55
...	1	1	...	1	...	...	...	8	1	2	1	4	1	20	1	2	...	36	4	56
1	13	...	...	...	...	...	...	14	...	29	...	40	1	81	18	30	1	194	20	57
...	1	...	...	...	...	...	...	5	...	1	...	3	...	25	10	9	2	43	12	58
...	...	...	...	...	...	...	...	2	...	...	...	3	2	5	...	...	...	10	2	59
1	6	...	...	...	...	...	...	17	...	2	...	8	1	68	10	11	6	106	17	60
9	38	...	...	...	10	4	14	25	9	14	6	59	13	380	176	57	41	535	245	61
...	1	...	...	...	...	...	...	...	1	...	...	3	...	21	12	1	1	25	14	62
...	2	...	...	...	...	...	...	...	...	1	...	7	...	21	3	2	...	31	3	63
1	4	...	...	...	...	...	...	6	1	5	...	2	1	26	7	3	1	42	10	64
1	5	...	...	...	...	...	...	3	1	3	2	6	1	34	6	8	3	54	13	65
1	3	...	...	...	...	...	...	10	1	...	...	...	2	40	8	3	4	53	15	66
305	631	39	84	73	13	18	31	7	1	23	4	77	11	268	171	19	14	394	201	67
757	2088	98	133	231	69	163	232	997	189	929	374	2,091	1,198	11,132	7,744	1322	867	16,471	10,872	
2,551								1,186		1,303		3,289		18,876		2,189		26,843		

(No. IV. *Continued.*)

DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND,

	COUNTIES.	PRISONS.	No. of Prison.	15. Previous Imprisonments in the same Prison of Criminal Prisoners **received** during the Period.																	
				Once before.		Twice.		Three Times.		Four Times.		Five Times.		6 times and under 10.		10 times and under 20.		20 times and under 50.		50 times and upwards.		Total
				M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
1	Aberdeen	Aberdeen	1	93	36	46	26	23	19	17	15	16	13	38	40	41	47	16	37	7	8	297
		Peterhead	2	8	3	5	2	3	...	3	...	1	1	...	3	...	1	...	...	...	...	20
		Huntly	3	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
		Fraserburgh	4	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
2	Argyle	Inveraray	5	9	1	4	1	1	1	...	...	...	...	...	1	...	...	...	...	..	...	14
		Campbeltown	6	13	3	2	...	1	...	1	1	2	...	...	3	2	2	1	...	...	...	22
		Tobermory	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	Ayr	Ayr	8	41	20	26	12	5	8	10	2	3	5	7	8	5	23	...	16	...	...	97
		Kilmarnock	9	21	5	4	2	2	2	3	...	1	1	1	2	2	...	...	...	...	...	34
4	Banff	Banff	10	9	1	1	2	3	...	1	4	1	...	1	...	...	1	...	...	...	...	16
		Keith	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	Berwick	Greenlaw	12	12	2	4	...	3	...	2	2	1	...	2	...	...	...	...	...	...	...	24
		Dunse	13	3	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
6	Bute	Rothesay	14	14	2	11	2	4	1	7	...	6	...	1	2	2	2	...	...	...	...	45
7	Caithness	Wick	15	5	...	1	2	5	...	...	...	1	...	3	...	...	...	...	...	...	...	15
8	Clackmannan	Alloa	16	9	4	2	3	3	2	2	2	2	1	6	3	3	4	...	...	...	...	27
9	Dumbarton	Dumbarton	17	27	12	13	1	5	2	4	3	2	...	...	2	2	...	3	...	...	...	56
		Kirkintilloch	18	5	2	...	2	2	2	1	...	...	...	1	...	...	...	...	...	...	...	9
		Helensburgh	19	5	3	...	...	...	...	1	1	1	1	...	...	1	...	...	...	...	...	8
10	Dumfries	Dumfries	20	36	18	14	11	12	5	7	4	8	3	20	5	6	9	6	3	...	5	109
11	Edinburgh	Edinburgh, including Court Buildings	21	477	514	183	277	97	194	63	182	40	154	121	357	114	340	58	500	8	206	1161
		Musselburgh	22	2	2	2	...	...	...	...	1	...	...	...	...	...	1	1	...	...	...	5
12	Elgin	Elgin	23	4	6	9	...	5	2	2	1	2	1	9	1	...	...	...	...	...	...	31
		Forres	24	2	...	1	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	5
13	Fife	Cupar	25	29	18	14	4	13	3	4	3	2	2	8	4	2	...	...	...	...	...	72
		Dunfermline	26	12	9	5	2	3	...	1	1	3	1	4	3	...	3	...	...	...	...	28
14	Forfar	Dundee	27	147	65	70	44	50	35	37	36	31	22	66	51	62	93	7	75	4	53	474
		Forfar	28	26	8	11	3	6	...	3	5	...	1	5	1	1	...	...	...	...	...	52
15	Haddington	Haddington	29	26	7	7	4	6	1	4	...	5	...	4	1	5	2	...	9	...	...	57
		Dunbar	30	9	...	2	...	1	...	2	...	1	...	...	...	...	5	1	...	...	...	16
16	Inverness	Inverness	31	19	11	5	4	6	4	2	1	2	1	3	2	...	5	...	...	...	...	37
		Portree	32	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
		Lochmaddy	33	1	...	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	4
		Fort-William	34	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
17	Kincardine	Stonehaven	35	9	1	1	2	2	...	...	...	...	...	1	...	...	...	...	...	...	...	13
18	Kinross	Kinross	36	2	...	2	...	1	...	...	...	1	...	2	2	1	...	...	...	...	...	9
19	Kirkcudbright	Kirkcudbright	37	5	1	2	1	2	1	2	...	1	...	3	...	1	...	...	...	...	...	16
		Maxwelltown	38	4	...	2	...	2	...	...	...	...	1	...	...	...	...	...	...	...	...	8
20	Lanark	Glasgow	39	940	480	428	351	250	310	103	164	98	144	196	285	66	125	43	69	3	5	2127
		Lanark	40	20	2	7	1	4	...	...	...	...	...	1	...	1	...	3	...	...	...	36
		Hamilton	41	59	9	18	7	7	4	6	3	7	2	11	2	3	8	12	14	1	...	124
		Airdrie	42	109	25	38	15	30	11	23	5	19	6	27	7	18	18	9	17	...	4	273
21	Linlithgow	Linlithgow	43	17	6	3	1	2	...	1	...	...	1	2	2	...	1	...	...	...	...	25
22	Nairn	Nairn	44	5	2	2	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	8
23	Orkney	Kirkwall	45	3	1	1	...	1	...	...	...	...	1	...	2	...	...	...	...	...	...	5
24	Peebles	Peebles	46	13	1	1	2	2	...	4	...	3	...	3	...	...	...	...	...	...	...	26
25	Perth	Perth	47	46	23	23	17	26	14	18	11	15	8	20	12	18	21	6	9	...	14	172
		Perth Police Cells	48	2	5	1	...	1	...	...	2	...	...	...	...	1	2	...	...	...	...	5
		Dunblane	49	8	5	2	...	...	2	...	1	1	...	...	...	...	...	...	...	...	...	11
26	Renfrew	Paisley	50	97	62	49	37	16	24	22	21	3	13	18	48	14	49	5	24	...	5	224
		Greenock	51	98	68	46	56	33	32	24	21	14	19	53	60	20	85	4	35	7	5	299
		Pollockshaws	52	12	5	4	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	18
27	Ross & Cromarty	Dingwall	53	3	...	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	5
		Tain	54	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
		Cromarty	55	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
		Stornoway	56	1	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	2
28	Roxburgh	Jedburgh	57	27	2	13	1	7	...	4	...	4	...	18	...	...	...	6	...	...	...	79
		Hawick	58	7	3	1	2	1	...	1	...	4	...	6	...	2	...	...	...	...	...	22
		Kelso	59	2	...	1	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	6
29	Selkirk	Selkirk	60	18	1	8	...	3	...	...	...	2	...	8	...	...	...	...	...	...	...	39
30	Stirling	Stirling	61	64	28	35	9	17	7	15	3	7	5	11	7	10	6	2	4	...	...	161
		Falkirk	62	7	5	5	...	3	...	1	...	3	1	...	...	...	...	1	...	...	...	20
31	Sutherland	Dornoch	63	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
32	Wigtown	Wigtown	64	6	...	2	...	...	...	1	...	...	...	2	...	...	...	...	...	...	...	11
		Stranraer	65	8	1	1	2	2	1	2	1	...	...	1	...	1	...	...	...	...	...	15
33	Zetland	Fort-Charlotte	66	2	2	1	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	3
25	Perth	General Prison	67	73	55	13	25	3	6	...	...	...	...	...	...	...	...	...	...	...	...	89
				2739	1547	1156	938	677	694	405	496	314	414	687	916	407	853	184	812	30	305	6,599
				4,286		2,094		1,371		901		728		1,603		1,260		996		335		13,3

for the Year ended on the 30th day of June 1868—*continued.*

No. IV.
(*Continued*

minal Prisoners received during the period in Local ons,* who had been in the neral Prison, in so far as known.					17. Sentences of Criminal Prisoners convicted during the Period.																	
					(1.) To Imprisonment for Definite Periods.										(2.) Imprisonment for Indefinite Periods, and not included in the preceding Classes of Imprisonment for Definite Periods.							
					10 Days and under.		11 Days and not above 60 Days.		Above 60 Days and under 6 Months.		6 Months and under 1 Year.		1 Year and upwards.		Total.		Until Caution be found to keep the Peace after Conviction on Criminal Charge.		Until, or instead of Payment of Fine or Penalty on Conviction of Offence, prosecuted for the Public Interest.		Total.	
ce.	More than once.		Total.																			
F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
9	2	2	18	11	239	203	175	95	15	...	6	2	2	...	437	300	1	...	102	33	103	33	
1	...	...	...	1	14	5	15	13	...	...	...	...	...	...	29	18	...	...	24	2	24	2	
...	...	...	...	...	12	3	...	...	...	...	...	...	...	...	12	3	...	...	...	...	...	...	
...	...	...	...	...	20	10	...	...	...	...	...	...	...	...	20	10	...	...	...	...	...	...	
1	...	...	...	1	43	15	25	8	5	...	1	1	...	...	74	24	...	...	...	...	...	...	
1	1	...	2	1	13	3	26	17	7	2	4	...	...	...	50	22	...	...	...	...	...	...	
...	...	...	...	...	7	1	3	1	...	...	...	...	...	...	10	2	...	...	...	...	...	...	
4	...	3	5	7	31	21	112	68	6	...	7	6	2	...	158	95	6	...	142	58	148	58	
2	...	..	...	2	4	3	42	18	4	2	...	...	...	...	50	23	...	...	54	7	54	7	
1	...	...	...	1	7	8	31	11	7	1	2	1	...	...	47	21	...	...	...	...	...	...	1
...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	1
...	...	...	1	...	9	2	30	2	6	6	4	1	...	...	49	11	...	...	22	10	22	10	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	1	...	6	4	42	5	1	...	2	...	...	...	51	9	...	...	41	11	41	11	1
...	...	...	1	...	6	...	13	4	1	...	...	...	...	1	20	5	...	...	...	...	...	...	1
1	2	...	3	1	19	13	34	25	5	1	...	...	...	...	58	39	...	...	...	...	...	...	1
...	...	...	2	...	109	28	70	25	5	...	7	1	...	...	191	54	...	...	...	...	...	...	1
...	...	...	...	...	2	7	...	...	...	...	...	...	...	...	2	7	...	...	20	4	20	4	1
...	...	...	...	...	17	13	1	...	...	...	...	...	...	...	18	13	...	...	...	...	...	...	1
2	...	...	...	2	98	44	169	58	5	...	...	...	3	...	275	102	...	...	...	...	...	...	2
46	13	11	51	57	328	366	893	1341	47	7	38	13	14	...	1320	1727	147	49	810	1095	957	1144	2
...	...	...	...	...	22	10	10	4	...	...	...	...	...	...	32	14	...	...	...	...	...	...	2
1	...	1	4	2	9	5	35	13	3	...	1	1	...	...	48	19	...	...	46	6	46	6	2
1	...	...	...	1	5	1	...	...	...	...	...	...	...	...	5	1	...	...	11	1	11	1	2
1	...	...	1	1	55	32	160	61	12	4	5	2	...	...	232	99	...	...	...	...	...	...	2
...	...	...	1	...	66	26	55	24	5	3	1	...	...	...	127	53	...	...	...	...	...	...	2
12	5	5	23	17	97	118	175	103	33	18	19	7	8	...	332	246	11	3	364	394	375	397	2
1	...	...	3	1	50	22	65	11	18	1	6	1	1	...	140	35	...	...	3	...	3	...	2
2	...	1	4	3	9	17	57	12	4	1	4	...	...	...	74	30	...	...	72	15	72	15	2
...	...	...	...	...	24	6	5	1	...	...	...	...	...	...	29	7	...	...	...	...	...	...	3
...	1	1	4	1	9	1	37	22	2	...	...	3	3	...	51	26	...	...	58	28	58	28	3
...	...	...	...	...	5	...	1	...	...	...	...	...	...	...	6	...	...	...	...	...	...	...	3
...	...	...	1	...	1	...	4	...	...	...	...	...	...	...	5	...	...	...	4	1	4	1	3
...	...	...	...	...	1	3	5	1	...	...	...	...	...	...	6	4	...	...	...	...	...	...	3
1	...	...	1	1	1	...	17	6	5	...	4	1	...	...	27	7	6	...	22	8	28	8	3
...	...	...	...	...	...	...	17	2	1	...	2	...	...	...	20	2	...	1	12	...	12	1	3
1	...	...	2	1	3	1	15	5	...	...	1	...	...	...	19	6	...	...	23	6	23	6	3
...	...	...	...	...	16	8	3	2	...	...	...	...	...	...	19	10	...	...	...	...	...	...	3
20	9	13	54	33	112	54	1467	696	64	22	112	53	85	35	1840	860	2	...	2175	1848	2177	1848	3
1	...	...	...	1	27	7	67	10	2	2	4	1	...	...	100	20	7	...	...	...	7	...	4
...	...	...	2	...	29	11	153	44	12	1	3	...	...	...	197	56	2	...	214	36	216	36	4
1	...	...	...	1	253	107	295	91	8	...	3	...	...	...	559	198	2	...	...	...	2	...	4
...	...	...	1	...	63	11	102	28	4	2	4	...	...	...	173	41	...	...	28	2	28	2	4
1	...	...	...	1	10	6	11	5	5	...	...	...	...	...	26	11	...	...	21	...	21	...	4
...	...	...	...	...	3	1	6	3	...	...	...	...	...	...	9	4	...	...	...	...	...	...	4
...	...	...	...	...	43	12	24	1	17	...	...	...	...	...	84	13	2	...	...	...	2	...	4
7	1	1	12	8	60	62	177	133	19	7	6	4	6	...	268	206	...	...	1	...	1	...	4
...	...	...	...	...	14	13	...	...	...	...	...	...	...	...	14	13	...	...	...	...	...	...	4
...	...	...	...	...	32	2	62	18	...	...	...	...	...	...	94	20	...	...	...	...	...	...	4
14	3	8	16	22	46	21	226	164	35	13	15	4	...	...	322	202	4	1	298	217	302	218	5
6	...	...	8	6	67	86	79	89	...	...	...	...	...	...	146	175	...	...	438	261	438	261	5
...	...	...	...	...	3	3	...	...	...	...	...	...	...	...	3	3	...	...	56	8	56	8	5
...	...	...	...	...	7	1	6	1	4	1	2	2	...	...	19	5	...	...	...	...	...	...	5
...	...	...	...	...	3	...	16	2	...	...	...	...	...	...	19	2	...	...	...	...	...	...	5
...	...	...	...	...	5	1	...	...	...	...	...	...	...	...	5	1	...	...	...	...	...	...	5
...	...	...	...	...	15	2	9	1	...	...	...	...	...	...	24	3	...	...	...	...	...	...	5
...	...	...	1	...	55	8	85	7	21	...	3	...	2	2	166	17	...	...	...	...	...	...	5
...	...	...	1	...	43	12	...	...	...	...	...	...	...	...	43	12	...	...	...	...	...	...	5
...	...	...	...	...	9	2	1	...	...	...	...	...	...	...	10	2	...	...	...	...	...	...	5
...	...	...	...	...	47	7	39	7	3	...	1	...	...	...	90	14	...	...	...	...	...	...	6
3	1	1	4	4	39	27	118	55	19	3	5	1	...	...	181	86	3	4	305	150	308	154	6
...	1	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	3	...	9	3	...	...	...	...	...	...	12	3	...	...	...	...	...	...	6
...	...	...	...	...	16	4	11	5	6	1	3	...	...	...	36	10	...	...	...	...	...	...	6
...	...	...	...	...	11	4	23	3	2	2	...	...	...	...	36	9	...	...	1	...	1	...	6
...	...	...	...	...	7	3	42	10	1	1	...	...	...	...	50	14	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	107	49	170	84	277	133	...	...	...	...	...	...	6
41	39	47	225	188	2,382	1,466	5,370	3,334	419	101	382	154	296	122	8,849	5,177	193	58	5,367	4,201	5,560	4,259	
	86		413		3,848		8,704		520		536		418		14,026		251		9,568		9,819		

* Those who were merely received into the Local Prisons to be transferred to the General Prison, and are thus entered in the previous Table as re-mmitted to the General Prison, are not included under this head.

(No. IV. *Continued.*)

DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND.

	COUNTIES.	PRISONS.	No. of Prison.	17—*contd.* Sentences of Criminal Prisoners, &c.—*contd.* (3.) To Penal Servitude. M.	(3.) To Penal Servitude. F.	(4.) To Death. M.	(4.) To Death. F.	(5.) Sentences of Male Juveniles to Whipping without Imprisonment. M.	18. Grand Total of Sentences. M.	18. Grand Total of Sentences. F.	19. Sentences of Male Juveniles to Whipping in addition to Imprisonment, as in No. 17. M.	20. Sentences to Hard 10 Days and under. M.	20. Sentences to Hard 10 Days and under. F.	20. Sentences to Hard 1 Days a above 6 M.
1	Aberdeen	Aberdeen	1	12	6	...	...	...	552	339	...	4	...	49
		Peterhead	2	...	...	...	...	2	55	20	...	1	...	...
		Huntly	3	...	...	...	...	...	12	3	...	3	...	...
		Fraserburgh	4	...	...	...	...	...	20	10	...	...	...	...
2	Argyle	Inveraray	5	1	...	...	...	...	75	24	...	...	...	1
		Campbeltown	6	...	...	...	...	...	50	22	...	...	...	5
		Tobermory	7	...	...	...	...	...	10	2	...	...	...	...
3	Ayr	Ayr	8	7	1	...	...	...	313	154	...	16	13	49
		Kilmarnock	9	...	...	...	...	...	104	30	...	...	...	...
4	Banff	Banff	10	...	...	...	...	...	47	21	...	...	...	4
		Keith	11	...	...	...	...	...	3	...	...	...	...	...
5	Berwick	Greenlaw	12	...	...	...	...	7	78	21	...	21	...	3
		Dunse	13	...	...	...	...	3	3	...	...	...	...	...
6	Bute	Rothesay	14	...	...	...	...	...	92	20	...	...	...	3
7	Caithness	Wick	15	...	...	...	...	...	20	5	...	...	...	3
8	Clackmannan	Alloa	16	..	...	...	...	3	61	39	...	2	...	10
9	Dumbarton	Dumbarton	17	...	...	...	...	...	191	54	...	2	...	3
		Kirkintilloch	18	...	...	...	...	...	22	11	...	...	...	...
		Helensburgh	19	...	...	...	...	...	18	13	...	...	...	...
10	Dumfries	Dumfries	20	...	1	1	...	...	276	103	...	7	...	6
11	Edinburgh	Edinburgh, including Court Buildings	21	34	10	*1	...	...	2,812	2,881	...	7	...	133
		Musselburgh	22	...	...	...	...	...	32	14	...	...	...	...
12	Elgin	Elgin	23	...	...	...	...	...	94	25	...	...	...	7
		Forres	24	...	...	...	...	...	16	2	2	...	...	...
13	Fife	Cupar	25	...	...	...	...	17	249	99	...	...	1	16
		Dunfermline	26	...	...	...	...	...	127	53	...	...	...	11
14	Forfar	Dundee	27	13	4	...	...	75	795	647	2	...	...	10
		Forfar	28	...	...	...	...	...	143	35	...	1	1	8
15	Haddington	Haddington	29	...	...	...	...	...	146	45	...	...	...	12
		Dunbar	30	...	...	...	...	...	29	7	...	...	...	...
16	Inverness	Inverness	31	1	1	...	...	...	110	55	...	...	...	1
		Portree	32	...	...	...	...	...	6	...	...	...	...	...
		Lochmaddy	33	...	...	...	...	...	9	1	...	...	...	...
		Fort-William	34	...	...	...	...	...	6	4	...	...	...	...
17	Kincardine	Stonehaven	35	...	...	...	...	...	55	15	...	...	...	...
18	Kinross	Kinross	36	...	...	...	...	...	32	3	...	...	...	...
19	Kirkcudbright	Kirkcudbright	37	...	...	...	...	...	42	12	...	...	...	18
		Maxwelltown	38	...	...	...	...	...	19	10	...	2	...	2
20	Lanark	Glasgow	39	68	38	...	...	11	4,096	2,746	...	2	...	24
		Lanark	40	...	...	...	...	...	107	20	...	...	...	6
		Hamilton	41	...	...	...	...	...	413	92	...	...	...	89
		Airdrie	42	...	...	...	...	12	573	198	6	...	...	36
21	Linlithgow	Linlithgow	43	...	...	...	...	...	201	48	...	...	...	6
22	Nairn	Nairn	44	...	...	...	...	...	47	11	...	...	...	...
23	Orkney	Kirkwall	45	...	...	...	...	...	9	4	...	...	...	...
24	Peebles	Peebles	46	...	...	...	...	...	86	13	...	...	...	...
25	Perth	Perth	47	11	2	...	...	...	280	208	...	1	...	7
		Perth Police Cells	48	...	...	...	...	...	14	13	...	...	...	...
		Dunblane	49	...	...	...	...	...	94	20	...	...	...	...
26	Renfrew	Paisley	50	...	...	...	...	...	624	420	...	...	...	35
		Greenock	51	...	...	...	...	...	584	436	...	...	...	...
		Pollockshaws	52	...	...	...	...	...	59	11	...	...	...	...
27	Ross and Cromarty	Dingwall	53	...	...	...	...	...	19	5	...	2	...	2
		Tain	54	...	...	...	...	...	19	2	...	...	...	...
		Cromarty	55	...	...	...	...	...	5	1	...	...	...	...
		Stornoway	56	...	...	...	...	...	24	3	...	...	...	...
28	Roxburgh	Jedburgh	57	2	...	...	...	2	170	17	...	1	...	13
		Hawick	58	...	...	...	...	...	43	12	...	...	...	...
		Kelso	59	...	...	...	...	...	10	2	...	7	2	1
29	Selkirk	Selkirk	60	...	...	...	...	3	93	14	...	...	...	1
30	Stirling	Stirling	61	11	...	...	...	...	500	240	...	17	1	93
		Falkirk	62	...	...	...	...	...	...	...	...	...	...	...
31	Sutherland	Dornoch	63	...	...	...	...	...	12	3	...	...	...	2
32	Wigtown	Wigtown	64	...	...	...	...	...	86	10	...	...	...	...
		Stranraer	65	...	...	...	...	...	87	9	...	...	...	4
33	Zetland	Fort-Charlotte	66	...	...	...	...	...	50	14	...	6	1	14
25	Perth	General Prison	67	...	...	...	...	...	277	133	...	...	...	3
				160	63	2	...	135	14,706	9,499	10	102	19	690
				223		2			24,205			121		1,0

* Commuted to Penal Servitude for life.

for the Year ended on the 30th day of June 1868—*continued.* (No. IV. *Continued.*)

ition to Imprisonment,					21. Insane Prisoners.													
							Received during the period, viz.,											
e 60 Days l under Months.		6 Months and upwards.		Total.	In Prison at commencement of period.		Committed as dangerous Lunatics.		Found by the Court to be unfit for Trial.		On Trial found to have been Insane.		Became Insane after Commitment to Prison.		Other Descriptions.		Total.		No. of Prison.
	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
	...	3	...	65	9	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1
	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	2
	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7
	...	...	...	65	19	...	...	1	...	...	...	...	...	...	...	...	...	1	...	8
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9
	...	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11
	...	...	...	25	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
	...	...	...	3	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	14
	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	15
	...	...	...	16	...	...	...	...	2	...	...	...	...	...	1	...	...	...	3	16
	...	...	...	5	...	...	...	1	3	...	...	...	...	...	...	...	...	1	3	17
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19
	...	...	...	13	...	...	...	1	1	...	...	...	...	...	1	...	...	1	2	20
	...	9	...	170	276	...	...	...	...	...	...	...	...	...	...	...	1	...	1	21
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	22
	...	...	...	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	23
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	24
	...	...	...	16	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25
	...	...	...	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	26
	...	3	2	16	4	...	...	...	...	...	...	1	...	...	...	...	...	1	...	27
	...	...	...	10	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	28
	...	1	...	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	29
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	30
	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	31
	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	32
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	33
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	34
	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	35
	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	36
	...	...	...	19	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	37
	...	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	38
	...	...	...	28	1	...	2	...	...	...	...	...	...	...	...	...	...	...	2	39
	...	...	...	6	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	40
	...	2	...	96	8	...	...	4	...	...	...	...	...	...	...	...	...	4	...	41
	...	...	...	36	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	42
	...	2	...	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	43
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	44
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	45
	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	46
	...	...	...	8	...	...	...	3	1	...	...	...	...	...	1	...	...	3	2	47
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	2	...	49
	...	1	...	45	1	...	...	...	...	...	...	...	1	...	...	...	...	...	1	50
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	51
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	52
	...	...	...	4	...	...	...	3	...	...	...	...	...	...	...	...	...	3	...	53
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	54
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	55
	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	...	...	2	1	56
	...	...	..	16	...	...	...	4	...	...	...	...	...	...	...	...	...	4	...	57
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	58
	...	...	...	8	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	59
	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60
	1	...	...	117	22	...	...	1	...	...	...	...	...	...	...	...	...	1	...	61
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	62
	...	...	...	2	...	...	...	1	...	...	...	...	...	...	...	1	...	2	...	63
	...	3	...	3	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	64
	...	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	65
	1	...	...	21	9	...	...	...	2	...	...	...	...	...	...	...	...	...	2	66
	...	3	...	10	...	32	14	...	...	1	2	...	...	...	...	...	...	33	16	67
	2	29	2	897	359	32	16	29	11	2	2	1	1	...	3	2	1	66	34	
78		31		1,256		48		40		4		2		3		3		100		

(No. IV. *Continued.*) DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND,

COUNTIES.	PRISONS.	No. of Prison.	21—*continued.* Insane Prisoners—*continued.* Died.		Discharged.		Removed to Lunatic Asylum.		In Prison at the end of the Period.		Total.		Whereof received during the period into the Department of the General Prison for Criminal Lunatics.		2 Revenue in for Tables Impr ur Payn Fin Pen unless wise st N
			M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
1 Aberdeen	Aberdeen	1	...	...	...	...	...	...	...	...	...	...	1	...	2
	Peterhead	2	...	...	...	...	1	...	...	...	1	...	...	...	...
	Huntly	3	...	...	...	...	...	...	...	...	...	...	...	...	...
	Fraserburgh	4	...	...	...	...	...	...	...	...	...	...	...	...	...
2 Argyle	Inveraray	5	...	...	...	...	...	...	...	...	...	...	...	...	...
	Campbeltown	6	...	...	...	...	...	...	...	...	...	...	...	...	...
	Tobermory	7	...	...	...	...	...	...	...	...	...	...	...	...	...
3 Ayr	Ayr	8	...	...	...	...	1	...	...	...	1	...	...	...	5
	Kilmarnock	9	...	...	...	...	...	...	...	...	...	...	...	...	...
4 Banff	Banff	10	...	...	...	...	...	...	...	...	...	...	...	...	1
	Keith	11	...	...	...	...	...	...	...	...	...	...	...	...	...
5 Berwick	Greenlaw	12	...	...	...	...	...	...	...	...	...	...	...	...	1
	Dunse	13	...	...	...	...	...	...	...	...	...	...	...	...	...
6 Bute	Rothesay	14	...	...	...	...	1	...	...	...	1	...	...	...	...
7 Caithness	Wick	15	...	...	...	...	...	...	...	...	...	...	...	...	...
8 Clackmannan	Alloa	16	...	...	...	...	...	3	...	...	...	3	...	...	...
9 Dumbarton	Dumbarton	17	...	...	1	1	2	...	...	...	1	3	...	...	...
	Kirkintilloch	18	...	...	...	...	...	...	...	...	...	...	...	...	...
	Helensburgh	19	...	...	...	...	...	...	...	...	...	...	...	...	...
10 Dumfries	Dumfries	20	...	...	...	...	1	2	...	...	1	2	...	...	...
11 Edinburgh	Edinburgh, including Court Buildings	21	...	...	...	1	...	...	...	...	...	1	...	...	18
	Musselburgh	22	...	...	...	...	...	...	...	...	...	...	...	...	...
12 Elgin	Elgin	23	...	...	...	...	...	...	...	...	...	...	...	...	...
	Forres	24	...	...	...	...	...	...	...	...	...	...	...	...	...
13 Fife	Cupar	25	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dunfermline	26	...	...	...	...	...	...	...	...	...	...	...	...	1
14 Forfar	Dundee	27	...	...	...	...	...	...	...	...	...	...	1	...	8
	Forfar	28	...	...	...	...	...	...	...	...	...	...	...	...	4
15 Haddington	Haddington	29	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dunbar	30	...	...	...	...	...	...	...	...	...	...	...	...	...
16 Inverness	Inverness	31	...	...	...	...	1	...	...	...	1	...	...	...	3
	Portree	32	...	...	...	...	...	...	1	...	1	...	...	...	...
	Lochmaddy	33	...	...	...	...	...	...	...	...	...	...	...	...	...
	Fort-William	34	...	...	...	...	...	...	...	...	...	...	...	...	...
17 Kincardine	Stonehaven	35	...	...	...	...	...	...	...	...	...	...	...	...	...
18 Kinross	Kinross	36	...	...	...	...	...	...	...	...	...	...	...	...	1
19 Kirkcudbright	Kirkcudbright	37	...	...	...	...	1	...	...	...	1	...	...	...	...
	Maxwelltown	38	...	...	...	...	...	...	...	...	...	...	...	...	...
20 Lanark	Glasgow	39	...	...	...	...	...	2	...	...	...	2	...	...	3
	Lanark	40	...	...	...	...	...	1	...	...	...	1	...	...	1
	Hamilton	41	...	...	...	...	4	...	...	...	4	...	...	...	5
	Airdrie	42	...	...	...	...	1	...	...	...	1	...	...	...	1
21 Linlithgow	Linlithgow	43	...	...	...	...	...	...	...	...	...	...	...	...	1
22 Nairn	Nairn	44	...	...	...	...	...	...	...	...	...	...	...	...	3
23 Orkney	Kirkwall	45	...	...	...	...	...	...	...	...	...	...	...	...	...
24 Peebles	Peebles	46	...	...	...	...	...	...	...	...	...	...	...	...	...
25 Perth	Perth	47	...	...	...	...	3	2	...	...	3	2	...	...	1
	Perth Police Cells	48	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dunblane	49	...	...	...	...	2	...	...	...	2	...	...	...	...
26 Renfrew	Paisley	50	...	...	...	...	...	...	...	...	...	...	...	1	...
	Greenock	51	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pollockshaws	52	...	...	...	...	...	...	...	...	...	...	...	...	...
27 Ross and Cromarty	Dingwall	53	...	...	1	...	2	...	...	...	3	...	...	...	...
	Tain	54	...	...	...	...	...	...	...	...	...	...	...	...	...
	Cromarty	55	...	...	...	...	...	...	...	...	...	...	...	...	...
	Stornoway	56	...	...	1	1	1	...	...	...	2	1	...	...	...
28 Roxburgh	Jedburgh	57	...	...	1	...	3	...	...	...	4	...	...	...	...
	Hawick	58	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kelso	59	...	...	...	...	...	...	...	...	...	...	...	...	...
29 Selkirk	Selkirk	60	...	...	...	...	...	...	...	...	...	...	...	...	...
30 Stirling	Stirling	61	...	...	...	...	1	...	...	...	1	...	...	...	...
	Falkirk	62	...	...	...	...	...	...	...	...	...	...	...	...	...
31 Sutherland	Dornoch	63	...	...	...	...	1	...	1	...	2	...	...	...	...
32 Wigtown	Wigtown	64	...	...	...	...	1	...	...	...	1	...	...	...	...
	Stranraer	65	...	...	...	...	...	...	...	...	...	...	...	...	1
33 Zetland	Fort-Charlotte	66	...	...	...	...	...	2	...	...	...	2	...	...	...
25 Perth	General Prison	67	2	...	...	3	...	...	33	14	35	17	...	...	...
			2	...	3	6	26	14	35	14	66	34	2	1	60
			2		9		40		49		100		3		63

for the Year ended on the 30th day of June 1868—*continued.*

No. IV. (*Continued.*)

General Conduct in Prison of Criminal Prisoners in **Confinement** during the Period.							24. Punishments for Misconduct in Prison of Criminal Prisoners in **Confinement** during the Period.														N o. Pris
							(1.) Ages of Prisoners who have incurred Punishment.										(2.) Description of Punishments.				
ood.	Tolerable.		Bad.		Total.		Under 16.		16 Years and under 18.		18 Years and under 21.		21 Years and under 50.		50 Years and above.		Total.		Number by temporary deprivation of Work.		Number by changes in Food.		
F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
372	9	2	3	...	657	374	...	...	3	...	7	1	21	...	...	...	31	1	...	...	43	1	
27	7	...	3	...	64	27	2	...	3	...	2	...	3	...	...	...	10	...	...	...	14	...	
3	...	...	...	...	13	3	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
10	...	...	...	...	24	10	...	...	...	...	...	...	...	...	....	...	...	...	...	...	...	...	
32	1	...	...	...	98	32	...	...	...	...	...	...	2	...	...	...	2	...	...	...	2	...	
24	6	2	2	1	71	27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
3	...	...	...	...	14	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
295	4	4	2	8	381	307	1	...	1	...	3	2	1	10	...	...	6	12	...	...	6	12	
41	1	...	...	...	132	41	...	...	...	...	1	...	6	...	...	...	7	...	...	...	9	...	
31	...	...	2	1	61	32	1	...	...	...	...	...	...	1	1	...	2	1	...	...	1	...	
...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
2	54	23	5	...	94	25	...	...	2	...	2	...	22	5	4	..	30	5	...	...	46	10	
2	...	...	...	...	16	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
21	12	1	...	...	119	22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
8	4	...	5	1	60	9	2	...	...	...	2	...	3	...	...	...	7	...	...	...	8	...	
35	11	8	5	4	75	47	...	...	...	...	...	...	1	...	...	...	1	...	...	...	1	...	
69	...	...	...	...	262	69	...	...	...	...	...	...	3	...	...	...	3	...	...	...	1	...	
15	...	...	...	...	29	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
18	...	...	...	...	25	18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
111	...	6	3	...	322	117	1	...	1	...	...	...	...	...	1	...	3	...	...	...	3	...	
3423	265	47	15	13	2637	3483	9	1	22	3	49	14	103	35	14	1	197	54	...	...	279	52	
18	...	...	...	...	40	18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
30	1	...	1	1	121	31	1	...	...	...	...	1	1	...	...	...	2	1	...	...	2	1	
2	...	...	...	...	16	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
108	8	1	2	...	283	109	...	...	2	...	1	1	7	1	...	...	10	2	...	...	11	2	
64	3	...	8	1	155	65	...	...	...	...	3	...	5	...	...	...	8	...	...	...	9	...	
709	80	28	23	5	1026	742	7	...	27	6	14	5	20	21	...	...	68	32	...	...	80	24	
43	2	...	2	...	216	43	2	...	...	...	4	...	2	...	...	...	8	...	...	...	8	...	
48	11	4	2	...	187	52	2	...	...	1	2	1	3	1	...	...	7	3	2	...	2	3	
9	3	1	...	...	36	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
61	5	1	...	1	136	63	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
1	...	...	...	...	9	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
2	1	...	...	...	19	2	...	...	...	...	1	...	1	...	...	...	2	...	...	...	2	...	
5	...	...	...	...	24	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
21	...	...	1	...	82	21	...	...	1	...	3	...	3	...	...	...	7	...	3	...	7	...	
4	5	...	1	...	42	4	...	...	1	...	1	...	3	...	...	...	5	...	...	...	5	...	
13	...	...	...	...	53	13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
10	...	...	...	...	20	10	...	...	...	...	...	..	...	...	...	...	...	...	...	..	...	...	
2982	94	41	35	15	4675	3038	26	1	58	5	61	6	70	6	1	...	216	18	...	...	370	40	
26	3	...	1	...	135	26	...	...	...	...	1	...	3	...	...	...	4	...	...	...	4	...	
93	11	3	1	2	486	98	...	...	2	...	...	1	11	4	...	...	13	5	...	...	15	5	
239	10	1	2	...	801	240	1	...	3	...	3	...	2	...	...	...	9	...	...	...	12	...	
50	9	...	2	1	253	51	...	...	...	...	1	...	8	...	...	...	9	...	...	...	10	...	
14	...	...	...	...	63	14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
7	...	...	...	...	15	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
14	...	...	...	...	93	14	...	...	...	...	...	...	3	...	...	...	3	...	...	...	...	...	
211	12	11	10	2	374	224	1	2	7	1	6	1	5	9	...	...	19	13	...	...	32	11	
16	...	...	...	...	16	16	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	
25	10	5	3	...	120	30	1	1	...	...	...	...	2	...	...	...	3	1	...	...	3	1	
517	6	3	1	3	758	523	...	...	4	...	5	5	23	7	...	1	32	13	...	...	30	8	
535	3	1	1	...	741	536	...	...	4	...	7	...	6	...	...	...	17	...	...	...	25	...	
15	...	...	...	...	120	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
5	3	2	1	...	34	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
6	...	...	...	...	33	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
1	...	...	...	...	6	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
3	10	1	3	1	36	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
21	8	1	...	...	205	22	...	...	1	...	1	...	2	1	2	...	6	1	6	1	6	1	
15	2	...	...	...	52	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
5	...	...	...	...	24	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
18	9	...	7	...	114	18	5	...	...	...	3	...	1	...	1	...	10	...	...	...	24	...	
258	4	2	7	2	583	262	1	...	1	...	4	2	10	4	...	...	16	6	...	...	20	11	
20	11	6	4	3	83	29	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
3	...	...	2	...	33	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
11	1	3	...	...	46	14	2	...	1	...	1	...	4	1	1	1	9	2	...	...	9	2	
11	4	2	3	1	54	14	1	...	1	...	1	...	2	1	1	...	6	1	...	1	6	1	
15	...	2	...	...	57	17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
508	63	31	39	23	767	562	12	2	20	2	36	9	98	52	5	6	171	71	1	...	153	42	
11,334	766	243	207	89	18,399	11,666	78	7	165	18	225	49	460	159	31	9	959	242	12	2	1,258	227	
3,760	1,009		296		30,065		85		183		274		619		40		1,201		14		1,485		

(No. IV. *Continued.*) DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND,

COUNTIES.	PRISONS.	No. of Prison.	24.—*continued.* Punishments for Misconduct in Prison of Criminal Prisoners, &c.—*continued.* (2.) Description of Punishments—*continued.* Number confined in Cells for the Refractory. Light Cells. M.	Light Cells. F.	Dark Cells. M.	Dark Cells. F.	Number by putting in Irons. M.	Number by putting in Irons. F.	Number of other Punishments. M.	Number of other Punishments. F.	(3.) Number of cases of Punishment by one or more of the modes in No. 2. M.	(3.) Number of cases of Punishment by one or more of the modes in No. 2. F.	25. State as to Instruction. (1.) On Admission. Could not Read. M.	Could not Read. F.	Read with difficulty. M.
1 Aberdeen	Aberdeen	1	...	...	3	...	...	...	...	...	46	1	113	92	374
	Peterhead	2	...	...	...	...	...	...	...	...	14	...	6	2	26
	Huntly	3	...	...	...	...	...	...	...	...	...	...	1	...	10
	Fraserburgh	4	...	...	...	...	...	...	...	...	...	...	4	1	14
2 Argyle	Inveraray	5	...	...	...	...	...	...	...	...	2	...	14	7	33
	Campbeltown	6	...	...	...	...	...	...	...	...	...	...	11	6	45
	Tobermory	7	...	...	...	...	...	...	...	...	...	...	1	3	10
3 Ayr	Ayr	8	...	...	1	4	...	4	2	24	6	24	66	52	136
	Kilmarnock	9	...	...	...	...	...	...	...	...	9	...	30	12	39
4 Banff	Banff	10	...	...	1	1	...	...	...	...	2	1	10	7	41
	Keith	11	...	...	...	...	...	...	...	...	...	...	1	...	1
5 Berwick	Greenlaw	12	...	...	...	...	...	...	2	...	48	10	8	11	73
	Dunse	13	...	...	...	...	...	...	...	...	...	...	3	...	4
6 Bute	Rothesay	14	...	...	...	...	...	...	...	...	...	...	12	3	84
7 Caithness	Wick	15	...	...	...	...	...	...	...	...	8	...	5	...	41
8 Clackmannan	Alloa	16	...	...	...	...	...	...	...	...	1	...	7	3	66
9 Dumbarton	Dumbarton	17	...	...	2	...	...	...	...	...	3	...	86	25	155
	Kirkintilloch	18	...	...	...	...	...	...	...	...	...	...	4	4	7
	Helensburgh	19	...	...	...	...	...	...	...	...	...	...	2	1	15
10 Dumfries	Dumfries	20	...	...	2	...	...	...	...	...	5	...	47	23	38
11 Edinburgh	Edinburgh, including Court Buildings	21	...	...	19	13	15	9	2	...	280	60	357	411	1,894
	Musselburgh	22	...	...	...	...	...	...	...	...	...	...	8	4	18
12 Elgin	Elgin	23	...	...	...	1	...	1	...	...	2	1	14	8	56
	Forres	24	...	...	...	...	...	...	...	...	...	...	4	1	11
13 Fife	Cupar	25	...	...	...	...	...	...	...	...	11	2	50	24	91
	Dunfermline	26	...	...	...	...	...	...	...	...	9	...	41	22	93
14 Forfar	Dundee	27	...	...	18	8	1	1	2	1	101	34	205	166	608
	Forfar	28	...	...	...	...	...	...	...	...	8	...	32	10	90
15 Haddington	Haddington	29	...	...	1	...	...	...	2	...	7	3	55	24	120
	Dunbar	30	...	...	...	...	...	...	...	...	...	...	11	7	18
16 Inverness	Inverness	31	...	...	...	...	...	...	...	...	...	...	20	13	97
	Portree	32	...	...	...	...	...	...	...	...	...	...	2	1	6
	Lochmaddy	33	...	...	...	...	...	...	2	...	2	...	8	2	6
	Fort-William	34	...	...	...	...	...	...	...	...	...	...	5	1	17
17 Kincardine	Stonehaven	35	...	...	...	...	...	...	...	...	10	...	11	3	40
18 Kinross	Kinross	36	...	...	...	...	...	...	...	...	5	...	3	...	11
19 Kirkcudbright	Kirkcudbright	37	...	...	...	...	...	...	...	...	...	...	5	1	31
	Maxwelltown	38	...	...	...	...	...	...	...	...	...	...	4	1	12
20 Lanark	Glasgow	39	...	...	17	32	4	5	...	...	370	40	861	739	760
	Lanark	40	...	...	...	...	...	...	...	...	4	...	69	14	52
	Hamilton	41	...	...	...	...	...	...	...	...	15	5	117	24	279
	Airdrie	42	...	...	...	...	...	...	...	...	12	...	258	86	389
21 Linlithgow	Linlithgow	43	...	...	...	...	...	...	...	...	10	...	86	19	115
22 Nairn	Nairn	44	...	...	...	...	...	...	...	...	...	...	5	1	49
23 Orkney	Kirkwall	45	...	...	...	...	...	...	...	...	...	...	4	1	10
24 Peebles	Peebles	46	...	...	...	...	...	...	3	...	1	...	7	2	24
25 Perth	Perth	47	...	...	1	3	...	...	2	...	35	14	37	24	260
	Perth Police Cells	48	...	...	...	...	...	...	...	...	...	...	4	2	3
	Dunblane	49	...	...	...	...	...	...	...	...	3	1	13	4	96
26 Renfrew	Paisley	50	...	...	5	6	...	1	3	2	38	17	110	97	419
	Greenock	51	...	...	...	...	...	...	...	...	25	...	167	165	240
	Pollockshaws	52	...	...	...	...	...	...	...	...	...	...	27	6	67
27 Ross and Cromarty	Dingwall	53	...	...	...	...	...	...	...	...	...	...	6	2	15
	Tain	54	...	...	...	...	...	...	...	...	...	...	5	2	11
	Cromarty	55	...	...	...	...	...	...	...	...	...	...	...	1	4
	Stornoway	56	...	...	...	...	...	...	...	...	...	...	9	2	23
28 Roxburgh	Jedburgh	57	...	...	...	...	...	...	...	...	6	1	35	8	159
	Hawick	58	...	...	...	...	...	...	...	...	...	...	12	3	10
	Kelso	59	...	...	...	...	...	...	...	...	...	...	5	2	5
29 Selkirk	Selkirk	60	...	...	...	...	2	...	...	...	26	...	15	2	14
30 Stirling	Stirling	61	3	3	2	...	5	3	...	...	30	17	104	61	384
	Falkirk	62	...	...	...	...	...	...	...	...	...	...	8	4	13
31 Sutherland	Dornoch	63	...	...	...	...	...	...	...	...	...	...	3	1	18
32 Wigtown	Wigtown	64	...	...	...	...	...	...	...	...	9	2	8	4	12
	Stranraer	65	...	...	...	...	...	...	...	...	6	1	8	8	40
33 Zetland	Fort-Charlotte	66	...	...	...	...	...	...	...	...	...	...	4	1	42
25 Perth	General Prison	67	...	...	53	28	9	11	338	143	344	97	35	35	108
			3	3	125	96	36	35	358	170	1,513	331	3,288	2,251	8,047
			6		221		71		528		1,844		5,539		14,1

for the Year ended on the 30th day of June 1868—*continued.* (No. IV. *Continued.*)

inal Prisoners **received** during the Period.

ng the said Period.

d well.	Total.		Writing.										(2.) Had learned more than mere Reading and Writing.		(3.) Improvement during the Period.						No. of Prison.
			Could not Write.		Could sign Name merely.		Write with difficulty.		Write well.		Total.				Have improved in Reading or Writing, or both.		Have improved in Arithmetic or other branches of Instruction.		Have learned a Trade in Prison.		
F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
17	616	340	165	189	...	...	399	146	52	5	616	340	11	1	102	87	7	...	10	36	1
9	58	23	13	10	...	...	33	12	12	1	58	23	...	...	...	...	...	...	...	...	2
...	12	3	1	...	4	...	6	3	1	...	12	3	...	...	...	...	...	...	...	...	3
...	20	10	4	3	...	...	14	7	2	...	20	10	...	...	...	...	...	...	...	...	4
10	91	28	33	19	...	...	31	6	27	3	91	28	...	...	1	...	...	...	...	...	5
...	60	26	24	19	...	...	31	7	5	...	60	26	2	...	5	3	...	...	...	...	6
...	12	3	7	3	4	...	...	...	1	...	12	3	...	...	...	...	...	...	...	...	7
60	353	204	146	124	...	...	162	71	45	9	353	204	8	1	20	34	12	9	3	12	8
5	118	37	52	30	32	2	29	5	5	...	118	37	...	...	...	...	...	...	...	...	9
1	57	28	14	18	...	...	37	9	6	1	57	28	10	...	5	...	5	...	...	...	10
...	3	...	1	...	...	...	1	...	1	...	3	...	...	...	...	...	...	...	...	...	11
...	87	24	28	14	...	...	56	10	3	...	87	24	...	...	48	...	12	...	...	...	12
...	9	...	3	...	...	...	4	...	2	...	9	...	...	...	...	...	...	...	...	...	13
1	105	20	31	15	...	...	69	4	5	1	105	20	52	2	6	...	2	...	...	...	14
...	47	6	11	3	...	...	36	3	...	...	47	6	...	...	...	...	...	...	...	...	15
...	74	41	16	30	2	1	55	10	1	...	74	41	...	...	8	...	8	...	...	...	16
...	244	66	126	47	4	3	92	15	22	1	244	66	19	...	8	3	5	...	...	...	17
6	27	11	16	6	...	...	10	2	1	3	27	11	...	...	...	...	...	...	...	...	18
1	18	15	10	6	3	5	4	3	1	1	18	15	...	...	...	...	...	...	...	...	19
84	302	112	98	63	...	...	34	16	170	33	302	112	5	...	86	12	8	...	94	12	20
32	2,405	3,325	636	890	...	...	1,660	2,415	109	20	2,405	3,325	...	...	226	529	116	160	...	...	21
...	32	14	12	8	10	2	6	4	4	...	32	14	...	...	...	...	...	...	...	...	22
7	110	29	26	16	...	...	75	11	9	2	110	29	8	2	8	2	5	...	...	...	23
...	16	2	8	1	...	...	7	1	1	...	16	2	...	...	...	...	...	...	...	...	24
37	258	104	88	71	...	...	154	31	16	2	258	104	20	...	115	59	35	8	...	...	25
1	146	62	58	36	...	...	75	25	13	1	146	62	11	...	81	13	24	2	...	...	26
20	916	690	352	414	...	...	501	264	63	12	916	690	16	1	398	83	36	12	...	...	27
8	192	43	65	28	...	...	113	15	14	...	192	43	...	...	25	6	...	...	...	...	28
4	182	48	71	31	58	6	47	10	6	1	182	48	6	...	4	...	1	...	...	...	29
...	29	7	15	7	...	...	14	...	...	...	29	7	...	...	...	...	...	...	...	...	30
3	128	50	38	30	7	...	72	19	11	1	128	50	8	1	22	9	5	...	6	4	31
...	9	1	7	1	1	...	...	...	1	...	9	1	...	...	1	...	...	...	...	...	32
...	19	2	12	2	2	...	1	...	4	...	19	2	...	...	...	...	...	...	...	...	33
...	22	5	7	1	5	1	10	3	...	...	22	5	...	...	3	...	...	...	...	...	34
2	71	19	24	13	...	...	33	6	14	...	71	19	...	...	2	1	6	...	...	...	35
2	41	4	5	2	...	...	12	2	24	...	41	4	...	...	18	1	2	...	...	...	36
3	48	13	8	3	...	...	34	10	6	...	48	13	...	...	1	...	...	...	...	...	37
3	20	10	9	4	...	...	9	4	2	2	20	10	...	...	...	...	...	...	...	...	38
1,822	4,284	2,766	1,932	1,870	...	...	1,800	774	552	122	4,284	2,766	7	...	396	305	182	48	...	...	39
2	128	24	67	19	39	4	21	1	1	...	128	24	1	...	...	...	...	...	...	...	40
7	466	94	223	65	...	...	219	28	24	1	466	94	...	...	15	1	...	...	...	...	41
30	771	229	426	184	209	30	101	12	35	3	771	229	79	2	13	1	2	...	...	...	42
3	234	49	122	37	...	...	98	12	14	...	234	49	5	...	11	1	2	...	1	...	43
1	58	13	12	8	...	...	42	4	4	1	58	13	2	...	...	...	...	...	...	...	44
...	14	7	5	1	...	...	9	6	...	...	14	7	...	...	...	...	...	...	...	...	45
5	92	14	25	7	...	...	32	3	35	4	92	14	25	3	6	...	6	...	...	...	46
4	337	215	107	126	...	...	213	89	17	...	337	215	1	...	16	1	15	...	...	...	47
6	14	13	4	9	...	...	6	4	4	...	14	13	2	...	...	...	...	...	...	...	48
...	110	25	33	16	74	9	...	...	3	...	110	25	...	...	24	5	...	...	...	...	49
27	681	455	314	375	...	...	334	80	33	...	681	455	1	...	218	150	21	2	...	...	50
130	636	462	314	368	...	...	229	71	93	23	636	462	49	3	...	...	...	...	...	...	51
...	96	13	34	6	...	...	60	7	2	...	96	13	...	...	...	...	...	...	...	...	52
1	32	6	18	2	2	2	8	...	4	2	32	6	2	1	7	1	7	2	...	...	53
...	33	5	11	4	...	...	6	1	16	...	33	5	...	...	...	...	...	...	...	...	54
...	5	1	2	1	2	...	...	...	1	...	5	1	...	...	...	...	...	...	...	...	55
...	36	4	23	4	...	...	8	...	5	...	36	4	...	...	...	...	...	...	...	...	56
...	194	20	66	13	...	...	128	7	...	...	194	20	11	...	30	2	4	...	...	...	57
6	43	12	22	6	7	2	6	1	8	3	43	12	...	...	...	...	...	...	...	...	58
...	10	2	5	2	...	...	5	...	...	...	10	2	...	...	...	...	...	...	...	...	59
10	106	17	28	11	...	...	37	3	41	3	106	17	9	1	2	...	...	...	...	...	60
9	535	245	200	165	...	...	308	77	27	3	535	245	3	...	99	70	9	...	...	...	61
2	25	14	10	8	8	3	5	2	2	1	25	14	...	...	...	...	...	...	...	...	62
...	31	3	8	2	1	...	20	1	2	...	31	3	...	...	2	...	...	...	2	...	63
2	42	10	19	8	...	...	22	2	1	...	42	10	1	...	1	...	...	...	...	...	64
2	54	13	15	8	20	2	14	2	5	1	54	13	...	...	...	...	...	...	...	...	65
...	53	15	4	1	...	...	47	14	2	...	53	15	...	...	...	...	...	...	...	...	66
87	394	201	65	77	12	24	205	93	112	7	394	201	141	14	384	176	232	28	160	74	67
1,981	16,471	10,372	6,354	5,560	506	96	7,909	4,443	1,702	273	16,471	10,372	515	32	2,417	1,555	769	271	276	138	
7,117	26,843		11,914		602		12,352		1,975		26,843		547		3,972		1,040		414		

(No. IV. *Continued.*) DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND,

	COUNTIES.	PRISONS.	No. of Prison.	26. Sickness and Deaths of Criminal Pris										To
				(1.) Age of Prisoners who have experienced Sickness.										
				Under 16 Years.		16 Years and under 18.		18 Years and under 21.		21 Years and under 50.		50 Years and above.		
				M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
1	Aberdeen	Aberdeen	1	4	...	5	2	6	...	68	30	7	2	90
		Peterhead	2	...	...	...	...	...	...	1	1	...	...	1
		Huntly	3	...	...	...	...	...	...	...	...	...	...	...
		Fraserburgh	4	...	...	...	...	...	...	1	...	...	...	1
2	Argyle	Inveraray	5	...	...	...	...	...	...	...	...	...	...	...
		Campbeltown	6	1	...	...	...	...	...	...	1	...	...	1
		Tobermory	7	...	...	...	...	...	...	...	...	...	...	...
3	Ayr	Ayr	8	...	...	...	...	...	1	2	10	...	2	2
		Kilmarnock	9	...	...	...	...	...	...	4	...	...	...	4
4	Banff	Banff	10	...	...	...	...	...	...	...	...	...	...	...
		Keith	11	...	...	...	...	...	...	...	...	...	...	...
5	Berwick	Greenlaw	12	...	...	...	...	3	...	...	1	1	...	4
		Dunse	13	...	...	...	...	...	...	...	...	...	...	...
6	Bute	Rothesay	14	...	...	...	...	...	...	5	...	...	...	5
7	Caithness	Wick	15	...	...	...	...	...	...	...	...	...	...	...
8	Clackmannan	Alloa	16	...	...	...	...	...	...	1	...	...	...	1
9	Dumbarton	Dumbarton	17	...	1	1	...	1	...	3	...	...	...	5
		Kirkintilloch	18	...	...	...	...	...	...	...	...	...	...	...
		Helensburgh	19	...	...	...	...	...	...	...	...	...	...	...
10	Dumfries	Dumfries	20	...	...	...	...	1	2	...	...	3	1	4
11	Edinburgh	Edinburgh, including Court Buildings	21	1	...	...	1	6	7	27	74	4	7	38
		Musselburgh	22	...	...	...	...	...	...	...	...	...	...	...
12	Elgin	Elgin	23	...	...	...	...	...	...	1	...	...	1	1
		Forres	24	...	...	...	...	...	...	1	...	...	...	1
13	Fife	Cupar	25	...	1	...	...	...	...	2	2	1	...	3
		Dunfermline	26	...	...	...	...	...	...	4	1	...	...	4
14	Forfar	Dundee	27	5	...	9	1	18	7	45	36	6	8	83
		Forfar	28	...	...	1	...	4	...	4	1	2	...	11
15	Haddington	Haddington	29	...	...	...	...	...	...	8	1	1	...	9
		Dunbar	30	...	...	...	...	...	...	...	...	...	...	...
16	Inverness	Inverness	31	...	...	...	...	...	...	1	1	...	...	1
		Portree	32	...	...	...	...	...	...	...	...	...	...	...
		Lochmaddy	33	...	...	...	...	...	...	...	...	...	...	...
		Fort-William	34	...	...	...	...	...	...	...	...	...	...	...
17	Kincardine	Stonehaven	35	...	...	...	...	...	1	6	2	...	...	6
18	Kinross	Kinross	36	...	...	...	...	...	...	3	...	...	...	3
19	Kirkcudbright	Kirkcudbright	37	...	...	...	1	2	...	16	3	...	...	18
		Maxwelltown	38	...	...	...	...	...	...	...	...	...	...	...
20	Lanark	Glasgow	39	2	...	11	2	20	8	68	53	10	12	111
		Lanark	40	...	...	...	...	...	...	...	...	...	...	...
		Hamilton	41	...	...	1	...	...	...	6	3	1	...	8
		Airdrie	42	...	...	...	1	...	2	3	2	2	...	5
21	Linlithgow	Linlithgow	43	...	...	...	...	1	...	1	1	...	...	2
22	Nairn	Nairn	44	...	...	...	...	...	...	2	...	...	...	2
23	Orkney	Kirkwall	45	...	...	...	...	...	...	...	...	...	...	...
24	Peebles	Peebles	46	...	...	1	...	1	...	2	1	...	...	4
25	Perth	Perth	47	1	...	3	...	8	1	44	25	9	5	65
		Perth Police Cells	48	...	...	...	...	...	...	...	...	...	...	...
		Dunblane	49	...	...	...	...	...	...	...	...	...	...	...
26	Renfrew	Paisley	50	2	...	5	2	9	7	70	83	4	9	90
		Greenock	51	...	...	...	...	2	8	20	21	...	2	22
		Pollockshaws	52	...	...	...	...	...	...	...	...	...	...	...
27	Ross and Cromarty	Dingwall	53	...	...	...	...	...	...	...	...	...	...	...
		Tain	54	...	...	...	...	...	...	...	...	...	...	...
		Cromarty	55	...	...	...	...	...	...	...	...	...	...	...
		Stornoway	56	...	...	...	...	...	...	...	...	...	...	...
28	Roxburgh	Jedburgh	57	...	...	...	...	...	...	...	...	...	...	...
		Hawick	58	5	2	...	...	...	...	...	...	...	...	5
		Kelso	59	...	...	...	...	...	...	3	...	...	...	3
29	Selkirk	Selkirk	60	...	...	...	...	1	...	3	...	...	...	4
30	Stirling	Stirling	61	...	...	...	...	...	...	8	4	5	1	18
		Falkirk	62	...	...	...	...	...	...	...	...	...	...	...
31	Sutherland	Dornoch	63	...	...	...	...	...	...	...	...	...	...	...
32	Wigtown	Wigtown	64	...	...	...	...	...	...	2	...	...	...	2
		Stranraer	65	1	...	...	...	...	...	...	...	1	1	2
33	Zetland	Fort-Charlotte	66	...	...	...	...	...	...	...	...	...	...	...
25	Perth	General Prison	67	2	1	1	3	5	5	17	27	4	2	29
				24	5	38	18	88	49	452	384	61	48	663
				29		51		137		836		109		1,

for the Year ended on the **30th day of June 1868**—*continued.*

(No. IV. *Continued.*)

nfinement during the Period, as appearing from the Register of Sickness.

(2.) Character of Disease, and Time of Appearance.										(3.) Number of Prisoners who have been off Work.																No. of Prisoners.
of r- ess.	Cases of Slight Disorders.		Total.		Appeared before Imprison-ment.		Appeared after Imprison-ment.		Total.		1 Day.		2 Days.		3 Days.		4 Days.		5 Days and under 10 Days.		10 Days and under 20 Days.		Above 20 Days.		Total.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
..	87	34	90	84	45	16	45	18	90	34	...	...	2	...	4	2	2	3	12	1	1	2	1	...	22	8	1
..	1	1	1	1	1	1	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	2
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
..	1	...	1	...	1	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	4
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
..	1	1	1	1	...	...	1	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7
4	...	9	2	13	1	8	1	5	2	13	...	...	...	...	...	...	...	1	...	1	...	3	2	8	2	13	8
..	4	...	4	...	3	...	1	...	4	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	9
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11
..	3	1	4	1	4	1	...	...	4	1	...	...	2	...	...	...	...	1	1	...	...	...	1	...	4	1	12
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
..	4	...	5	...	1	...	4	...	5	...	...	...	...	...	1	...	...	...	2	...	1	...	1	...	5	...	14
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	15
..	...	...	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	16
..	5	1	5	1	5	1	...	...	5	1	1	...	1	...	...	...	2	...	1	1	...	...	...	...	5	1	17
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19
1	...	2	4	3	3	1	1	2	4	3	...	...	...	2	...	...	...	...	1	...	2	1	1	...	4	3	20
8	34	81	38	89	33	77	5	12	38	89	...	1	5	22	15	22	5	25	7	10	4	7	2	2	38	89	21
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	22
..	1	1	1	1	...	1	1	...	1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	1	1	1	23
..	1	...	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	24
..	2	3	3	3	3	3	...	...	3	3	...	...	1	2	...	1	...	...	...	...	2	...	...	...	3	3	25
..	4	1	4	1	4	1	...	...	4	1	...	...	...	...	...	...	...	...	2	1	2	...	...	...	4	1	26
5	75	42	83	47	73	35	10	12	83	47	1	...	...	1	8	4	12	11	22	15	3	6	2	...	48	37	27
..	11	1	11	1	9	1	2	...	11	1	...	...	...	...	...	...	...	...	...	...	2	...	...	...	2	...	28
..	9	1	9	1	7	1	2	...	9	1	...	...	1	...	1	...	1	...	...	...	1	...	...	...	4	...	29
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	30
..	1	1	1	1	...	1	1	...	1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	1	1	1	31
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	32
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	33
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	34
..	6	3	6	3	5	2	1	1	6	3	...	...	...	...	...	...	...	...	1	...	...	...	1	1	2	1	35
..	3	...	3	...	2	...	1	...	3	...	...	...	...	...	...	...	1	...	...	...	1	...	1	...	3	...	36
..	14	4	18	4	14	3	4	1	18	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	37
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	38
13	89	62	111	75	80	46	31	29	111	75	3	...	5	1	4	4	6	3	22	15	33	25	38	27	111	75	39
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	40
..	7	3	8	3	6	2	2	1	8	3	...	...	...	...	...	...	2	...	1	1	...	1	5	1	8	3	41
1	3	4	5	5	3	4	2	1	5	5	...	...	...	1	2	...	...	...	2	3	1	1	...	...	5	5	42
..	...	1	2	1	1	1	1	...	2	1	...	...	...	...	...	...	...	...	...	...	1	1	1	...	2	1	43
..	2	...	2	...	...	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	2	...	44
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	45
..	4	1	4	1	1	1	3	...	4	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	46
..	60	31	65	31	51	23	14	8	65	31	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	47
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	49
8	87	93	90	101	82	99	8	2	90	101	...	2	2	5	3	4	20	18	18	14	4	10	1	4	48	57	50
..	22	31	22	31	18	25	4	6	22	31	1	1	...	2	1	3	...	1	3	4	...	2	...	...	5	13	51
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	52
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	53
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	54
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	55
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	56
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	57
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	58
..	5	2	5	2	5	2	...	...	5	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	59
..	3	...	3	...	3	...	...	...	3	...	...	...	2	...	...	...	...	...	1	...	...	...	...	...	3	...	60
..	4	...	4	...	4	...	...	...	4	...	2	...	...	...	...	...	1	...	...	...	1	...	...	...	4	...	61
3	10	2	13	5	7	4	6	1	13	5	...	...	1	...	...	1	2	1	3	2	2	...	4	2	12	6	62
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	63
..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	64
..	2	...	2	...	2	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	65
..	2	1	2	1	...	...	2	1	2	1	...	...	...	...	...	...	1	...	1	...	...	1	...	...	2	1	66
..	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	67
16	13	22	29	38	14	23	15	15	29	38	...	...	...	2	3	4	1	2	8	4	4	11	13	11	29	34	68
59	580	440	663	499	493	383	170	116	663	499	8	4	23	38	42	45	56	66	113	72	67	72	76	58	385	355	
2	1,020		1,162		876		286		1,162		12		61		87		122		185		139		134		740		

(No. IV. *Continued.*) DIGEST of RETURNS relative to PRISONS and PRISONERS in SCOTLAND,

	COUNTIES.	PRISONS.	No. of Prison.	26.—*continued.*—Sickness and Deaths of Criminal Prisoners, &c.—*continued*								
				(4.) Time which Prisoners have been off Work from Illness, including Time which Prisoners not required to Work would have been withdrawn had they been at Work.				Number of Prisoners Removed on Account of Sickness.		Number Liberated on Account of Sickness.		Nu of L
				Total Number of Days.		Average Number of Days per Prisoner, calculated on the Average Number of Prisoners.						
				M.	F.	M.	F.	M.	F.	M.	F.	M.
1	Aberdeen	Aberdeen	1	167	51	4	2	1	...	...	...	...
		Peterhead	2	...	10	...	5	...	...	...	...	..
		Huntly	3	...	...	...	...	...	...	...	...	...
		Fraserburgh	4	2	...	2	...	...	...	...	...	...
2	Argyle	Inveraray	5	...	...	...	...	...	...	...	...	...
		Campbeltown	6	...	...	...	...	...	...	...	...	...
		Tobermory	7	...	...	...	...	...	...	...	...	...
3	Ayr	Ayr	8	129	855	5	9	...	...	...	1	...
		Kilmarnock	9	9	...	1	...	...	...	...	...	...
4	Banff	Banff	10	...	...	...	...	...	...	...	...	...
		Keith	11	...	...	...	...	...	...	...	...	...
5	Berwick	Greenlaw	12	42	4	5	1	...	...	...	...	...
		Dunse	13	...	...	...	...	...	...	...	...	...
6	Bute	Rothesay	14	135	...	17	...	...	...	...	...	...
7	Caithness	Wick	15	...	...	...	...	...	...	...	...	...
8	Clackmannan	Alloa	16	5	...	1	...	...	...	...	...	...
9	Dumbarton	Dumbarton	17	18	7	1	2	...	...	...	...	...
		Kirkintilloch	18	...	...	...	...	...	...	...	...	...
		Helensburgh	19	...	...	...	...	...	...	...	...	...
10	Dumfries	Dumfries	20	75	17	4	3	...	...	...	...	...
11	Edinburgh	Edinburgh, including Court Buildings	21	214	482	1	3	...	...	...	...	2
		Musselburgh	22	...	...	...	...	...	...	...	...	...
12	Elgin	Elgin	23	6	47	1	23	...	...	...	...	...
		Forres	24	10	...	...	...	...	...	...	...	...
13	Fife	Cupar	25	32	7	2	1	...	...	...	...	...
		Dunfermline	26	54	28	6	7	...	...	...	...	...
14	Forfar	Dundee	27	217	207	3	6	...	...	1	...	1
		Forfar	28	41	...	2	...	...	...	...	...	...
15	Haddington	Haddington	29	27	...	2	...	...	...	...	...	...
		Dunbar	30	...	...	...	...	...	...	...	...	...
16	Inverness	Inverness	31	6	13	1	3	...	...	...	...	...
		Portree	32	...	...	...	...	...	...	...	...	...
		Lochmaddy	33	...	...	...	...	...	...	...	...	...
		Fort-William	34	...	...	...	...	...	...	...	...	...
17	Kincardine	Stonehaven	35	29	29	4	14	...	...	...	...	...
18	Kinross	Kinross	36	78	...	26	...	...	...	...	...	...
19	Kirkcudbright	Kirkcudbright	37	...	...	...	...	...	...	...	...	...
		Maxwelltown	38	...	...	...	...	...	...	...	...	...
20	Lanark	Glasgow	39	2,284	1,535	6	8	...	...	3	...	4
		Lanark	40	...	...	...	...	...	...	...	...	...
		Hamilton	41	171	88	8	18	...	...	...	...	...
		Airdrie	42	31	37	1	4	...	...	...	1	...
21	Linlithgow	Linlithgow	43	68	14	3	5	...	...	1	...	...
22	Nairn	Nairn	44	30	...	10	...	...	...	...	...	...
23	Orkney	Kirkwall	45	...	...	...	...	...	...	...	...	...
24	Peebles	Peebles	46	...	...	...	...	...	...	...	...	...
25	Perth	Perth	47	121	...	3	...	...	...	...	...	1
		Perth Police Cells	48	...	...	...	...	...	...	...	...	...
		Dunblane	49	...	...	...	...	...	...	...	...	...
26	Renfrew	Paisley	50	261	404	4	7	...	...	...	...	...
		Greenock	51	23	68	1	5	...	1	...	...	...
		Pollockshaws	52	...	...	...	...	...	...	...	...	...
27	Ross and Cromarty	Dingwall	53	...	...	...	...	...	...	...	...	...
		Tain	54	...	...	...	...	...	...	...	...	...
		Cromarty	55	...	...	...	...	...	...	...	...	...
		Stornoway	56	...	...	...	...	...	...	...	..	...
28	Roxburgh	Jedburgh	57	...	...	...	...	...	...	...	...	...
		Hawick	58	...	...	...	...	...	...	...	...	...
		Kelso	59	10	...	...	...	...	...	...	...	...
29	Selkirk	Selkirk	60	17	...	3	...	...	...	...	...	1
30	Stirling	Stirling	61	196	119	5	9	...	...	...	...	...
		Falkirk	62	...	...	...	...	...	...	...	...	...
31	Sutherland	Dornoch	63	...	...	...	...	...	...	...	...	...
32	Wigtown	Wigtown	64	97	...	32	...	...	...	...	...	...
		Stranraer	65	10	12	2	12	...	...	...	...	...
33	Zetland	Fort-Charlotte	66	...	...	...	...	...	...	...	...	...
25	Perth	General Prison	67	1,572	1,251	4	3	...	...	...	...	6
				6,187	5,285	4	5	1	1	5	2	15
				11,472		4		2		7		2

for the Year ended on the 30th day of June 1868—*continued.* (No. IV. *Continued.*)

27. Civil Prisoners.																	No. of Prison.
(1.) Amount of Debts.									(2.) Other Causes, including *In meditatione fugæ*, and *Ad factum præstandum.*		Total.		(3.) Work.				
ies or itures 6s. 8d. under.	Above £8, 6s. 8d. and under £20.		£20 and under £50.		£50 and under £100.		£100 and upwards.						Number who have consented to Work.		Number who have not consented to Work.		
F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
...	26	1	16	...	2	...	5	...	1	1	56	2	...	...	56	2	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	4
...	2	...	2	...	1	...	...	...	...	...	5	...	...	...	5	...	5
...	2	...	...	...	...	...	...	...	...	...	3	...	...	...	3	...	6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7
...	12	...	6	...	4	...	3	...	...	...	27	...	...	...	27	...	8
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9
...	3	1	2	...	2	...	...	...	1	...	8	1	...	...	8	1	10
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11
...	2	...	2	...	2	...	...	...	...	...	6	...	...	...	6	...	12
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
...	3	...	1	...	...	...	...	...	...	...	4	...	...	...	4	...	14
...	3	...	5	...	...	...	...	...	4	...	12	...	...	...	12	...	15
...	4	...	...	...	...	...	...	...	1	...	5	...	...	...	5	...	16
...	6	...	2	...	...	...	...	...	1	...	10	...	...	...	10	...	17
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19
...	9	...	8	...	...	...	...	...	...	...	19	...	...	...	19	...	20
...	39	4	22	1	6	1	2	...	8	1	83	7	...	...	83	7	21
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	22
...	6	...	3	...	...	...	...	...	...	...	9	...	...	...	9	...	23
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	24
...	6	...	2	...	1	...	2	...	...	...	13	...	...	...	13	...	25
...	5	...	1	...	...	...	...	...	...	...	6	...	...	...	6	...	26
...	7	3	12	1	1	...	4	...	1	...	25	4	1	...	24	4	27
...	7	...	9	...	1	...	4	...	1	...	27	...	...	...	27	...	28
...	3	...	2	...	...	...	...	...	1	...	8	...	1	...	7	...	29
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	30
...	7	...	5	2	2	...	1	...	...	...	15	2	2	1	13	1	31
...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	1	...	32
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	33
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	34
...	2	...	2	1	...	...	...	...	...	...	4	1	...	1	4	...	35
...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	36
...	1	...	2	1	1	...	...	...	1	...	5	1	...	...	5	1	37
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	38
...	102	7	42	2	19	1	13	...	10	1	187	11	...	...	187	11	39
...	2	...	...	...	2	...	...	...	...	...	4	...	...	...	4	...	40
...	1	...	3	...	...	...	2	...	1	...	7	...	2	...	5	...	41
...	8	...	7	...	...	...	...	...	...	...	16	...	...	...	16	...	42
...	1	...	2	...	...	...	...	...	...	...	3	...	...	...	3	...	43
...	...	...	2	...	...	...	1	...	...	...	3	...	1	...	2	...	44
...	6	...	1	...	...	...	...	...	...	...	8	...	...	...	8	...	45
...	2	...	3	...	1	...	...	...	...	...	6	...	...	...	6	...	46
...	6	...	6	...	1	...	1	...	3	1	17	1	1	1	16	...	47
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	49
...	23	2	10	...	1	1	2	...	1	...	41	3	2	1	39	2	50
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	51
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	52
...	1	...	4	...	...	...	...	...	...	...	5	...	1	...	4	...	53
...	2	...	1	...	...	...	1	...	...	...	4	...	...	...	4	...	54
...	2	...	...	...	...	...	...	...	...	...	2	...	...	...	2	...	55
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	56
...	...	...	...	...	...	...	...	...	5	1	5	1	...	...	5	1	57
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	58
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	59
...	1	...	1	...	1	...	1	...	...	...	4	...	...	...	4	...	60
...	18	...	1	...	2	...	...	...	...	1	16	1	...	...	16	1	61
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	62
...	1	...	1	...	...	...	...	...	...	...	2	...	1	...	1	...	63
...	2	...	...	...	...	...	...	...	...	...	2	...	...	...	2	...	64
...	1	...	...	...	...	...	...	...	...	...	2	...	...	...	2	...	65
...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	1	...	66
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	67
...	330	18	189	8	50	3	42	...	41	6	687	35	12	4	675	31	
35	348		197		53		42		47		722		16		706		

TABULAR STATEMENT showing the number of Convicts sentenced to Transportation and Penal Servitude in the several Prisons in Scotland at 30th June 1867; the number so sentenced from that date to 30th June 1868; and the number remaining in Prison at 30th June 1868.

COUNTIES.	PRISONS.	Number in Prison at Commencement of Period.			Number in Prison at end of Period.			Number Sentenced to Penal Servitude during the year ended 30th June 1868.																			
								5 Years.		6 Years.		7 Years.		8 Years.		9 Years.		10 Years.		12 Years.		14 Years.		15 Years.		20 Years.		Life.		Total.	
		M.	F.	T.	M.	F.	T.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Aberdeen	Aberdeen	...	...	...	2	...	2	2	...	...	...	7	4	1	2	...	...	2	...	...	...	...	...	...	...	...	...	...	...	12	6
Argyle	Inverary	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Ayr	Ayr	...	88	88	...	89	89	3	...	...	...	2	1	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	7	1
Dumfries	Dumfries	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Edinburgh	Edinburgh	11	1	12	4	...	4	2	1	...	...	20	7	10	2	...	...	2	...	...	...	...	...	...	...	1	...	...	...	34	10
Forfar	Dundee	...	...	...	...	...	...	3	...	...	...	6	4	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13	4
Inverness	Inverness	2	...	2	1	...	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Lanark	Glasgow	...	...	...	14	...	14	16	4	...	...	23	28	12	4	...	...	10	1	2	...	...	...	4	1	1	...	...	...	68	38
Perth	Perth	...	...	...	...	...	...	4	...	...	...	3	1	4	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	2
Renfrew	Paisley	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Roxburgh	Jedburgh	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Stirling	Stirling	1	...	1	2	...	2	2	...	...	...	3	...	3	...	...	...	2	...	...	...	...	...	1	...	...	...	...	...	2	...
Perth	General Prison	91	207	298*	98	206	304†	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	...
		107	296	403	121	295	416	34	5	...	...	66	47	33	9	...	...	18	1	2	...	...	...	5	1	2	...	...	...	160	63
								39		...		113		42		...		19		2		...		6		2		...		223	

* Including 8 in Lunatic Department.
† Including 6 in Lunatic Department.

29. TABLE showing the Number of Prisoners who have Escaped, and the number who have been Re-taken, during the period.

County.	Prison.	Number who have Escaped.			Number who have been Re-taken.		
		M.	F.	T.	M.	F.	T.
Caithness	Wick	1	...	1	1	...	1
Forfar	Dundee	1	...	1	1	...	1
Lanark	Lanark	1	...	1	1	...	1
Ross and Cromarty	Tain	1	...	1	...	...	...
		4	...	4	3	...	3

30. TABLE showing the Number of Suicides by Prisoners during the period.

Counties.	Prisons.	Number of Suicides.	Date of Suicide.	Age.	Untried.	Convicted.
Fife	Cupar	1	11th Feb. 1868.	43	...	1 M.
Selkirk	Selkirk	1	30th Sept. 1867.	30	...	1 M.

No. V.—INSPECTION OF LOCAL PRISONS.

GEST of RETURNS by COUNTY PRISON BOARDS with reference to the System of Inspection prescribed by the 6th Rule for Prisons in Scotland, relative to the Prisons under their charge **in the Year** ended on the **30th day of June 1868.**

RULE 6.—"County Boards shall provide for the inspection of each of their Prisons (including an examination of every Prisoner, and of every Cell and Room) by at least one of their own number, not less frequently than once in each month; "and the date of the Inspection, together with the names of the Visitors, shall be recorded in the Inspection Book, and the result shall either be entered there by the Inspecting Members, or a Special Report made by them "to the County Board; and, in either case, the Reports shall be transcribed in the Minutes of the proceedings of the County Board."

...TIES.	PRISONS.	Has the Rule been observed in all respects in each Prison?	If the Rule has not been observed in all respects, state to what extent not observed, with the reason.	Total number of Inspections during the year.	General Results of Inspection in regard to: State of Buildings.	State of Prison Discipline and conduct of Officers.	Treatment of Prisoners.	Employment of Prisoners.	Instruction, Moral and Religious, of Prisoners.	Sufficiency of Exercise.	Health of Prisoners.	REMARKS.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
berdeen,	Aberdeen, ...	Yes.	.....	20	Tolerable.	Good.	Good. According to Rules.	All suitably employed.	Attended to.	Sufficient.	Good.	
	Peterhead, ...	Yes.	.....	18	Good.	Good.	According to Rules.	Picking Oakum, saddlery work, making and mending Prison clothes, knitting stockings, washing and cleaning clothes, etc.	Chaplain of Prison visits Jail twice a week.	Sufficient.	Good.	
	Huntly, ...	Yes.	Yes, when prisoners were confined.	8	Good.	According to Rules. The Officers have done their duty.	According to Rules.	Crank labour.	The parish Minister visits.	Yes.	Good.	
	Fraserburgh,...	Yes, with exception of three visits.	.....	9	Enclosure walls require some repairs.	.....	Good.	.....	Minister of the parish occasionally visits.	.....	Good.	
rgyle.....	Inveraray, ...	Yes.	.....	11	Good.	Satisfactory.	Satisfactory.	All employed in suitable kinds of labour.	Attended to.	Sufficient.	Good.	
	Campbeltown,	It has been observed.	.....	20	Good.	According to Rules.	According to Rules.	Prisoners are constantly employed.	Attended to by Chaplain, U. P. Missionary, and Roman Catholic Priest.	1½ hour per day.	Good.	
	Tobermory, ...	Inconsistent answer.	Inconsistent answer.	2	Good.	Good.	Good.	Teasing oakum.	.....	1 hour each day.	Good.	
yr,.....	Ayr, ...	Yes.	.....	31	Good.	Satisfactory.	According to Rules.	Fully employed.	According to Rules.	Sufficient.	Good.	
	Kilmarnock, ...	No.	Not inspected according to Rules.	1	Good.	Satisfactory.	According to Rules.	Fully employed.	Regular.	Sufficient.	Good.	
anff, ...	Banff, ...	Yes.	.....	12	Good.	Good.	Good.	Fully employed.	Satisfactory.	Yes.	Good.	
	Keith, ...	No.	See Remarks.	None by County Board, but by Chief Constable every 10 days or thereabouts.	Good.	Good.	Good.	Prisoners are not employed in this Prison, as it is only legalized for 10 days.	None, owing to short imprisonments. Prison being only legalized for 10 days.	None, owing to short imprisonments.	Good.	There is no resident Member of the Board, but the Clerk and Chief Constable of County Police are appointed to visit.

INSPECTION OF LOCAL PRISONS—*continued.*

TIES.	PRISONS.	Has the Rule been observed in all respects in each Prison?	If the Rule has not been observed in all respects, state to what extent not observed, with the reason.	Total number of Inspections during the year.	General Results of Inspection in regard to: State of Buildings.	State of Prison Discipline and conduct of Officers.	Treatment of Prisoners.	Employment of Prisoners.	Instruction, Moral and Religious, of Prisoners.	Sufficiency of Exercise.	Health of Prisoners.	REMARKS.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
rwick, ...	Greenlaw, ...	No.	Reference to correspondence with late General Board.	4	Good.	Good.	Good.	Shoemaking, oakum teasing, sand beating, mat-making, sewing, and knitting.	Good.	Sufficient.	Good.	
	Dunse, ...	No return.	.....	.....	.....	.....	.....	.....	.....	.....	.....	
te, ...	Rothesay, ...	Yes.	.....	16	Good.	Good.	Good.	Picking oakum, and performing domestic and other services in the Prison.	Attended to.	Sufficient.	Generally good.	
ithness,	Wick, ...	Rule observed.	.....	13	Good.	Good.	In accordance with Rules.	Employed.	Attended to.	Sufficient.	Good.	
kmanan	Alloa, ...	In all respects, except that stated in next column.	In the month of May last the inspection was omitted.	14	.....	.....	.....	.....	.....	.....	.....	The Minutes by the parties inspecting do not notice these separate heads: but state generally that the Prison was in good order, and no complaints made by prisoners.
mbarton,	Dumbarton, ...	Yes.	.....	12	Good.	Good.	In terms of Rules.	Various.	According to Rules.	Sufficient.	Very good.	
	Helensburgh, } Kirkintilloch, }	....	....	....	....	....	....	... ...	....	....	....	Besides occasional visits by the Members of the County Prison Board, these Prisons are visited quarterly by the Keeper of Dumbarton Prison, and the results of his visits reported to the County Board. They are legalized only for periods not exceeding 10 days.
mfries,	Dumfries, ...	No.	Although the number of visits are 15, none occurred in July and November. The death of the former Chairman in July accounts for the omission in that month.	15	In good state in every way.	Good.	Good.	Fully employed.	Well attended to.	Yes.	Generally good.	
linburgh,	Edinburgh, ...	Yes; so far as stated in columns 3 and 4.	In every case all the prisoners were not visited, but the visits were to such extent as the Members thought to be necessary.	21 by Members of the Board.	Good.	Satisfactory.	In terms of Rules.	All engaged in suitable employment.	In accordance with Rules, and results satisfactory.	Sufficient.	Good.	
	Court Buildings Prison,	Do.	This Prison is principally visited by the Governor of the Prison of Edinburgh, who, in every instance, extends his visits to all the cells and prisoners.	No visits by Members of the Board.	Good.	Satisfactory.	In terms of Rules.	Only prisoners under examination are confined here, and there is, therefore, no work done.	There is service once a week by one of the Teachers of the Prison of Edinburgh.	No airing-ground, but prisoners are only a few days in this Prison.	Good.	

	Musselburgh,	Do.	This Prison was visited by Members of the Board and by the Governor of the Prison of Edinburgh, who, in each instance, inspected every cell and visited every prisoner.	2 by Members of the Board,	Good.	Satisfactory.	In terms of Rules.	The periods of imprisonment are very short; convicted prisoners are employed in teasing oakum.	The Prisoners are visited and instructed by the Minister of the parish or his Assistant.	There is no airing-yard, but, the rooms being large, the prisoners can have sufficient exercise in them.	Good.
Elgin, ...	Elgin, ...	Yes.	.....	16	Good.	Good.	According to Rules.	All suitably employed.	In accordance with Rules, and results satisfactory.	Sufficient.	Good.
	Forres, ...	So far as stated in columns 3 & 4.	This Prison is principally visited by the Governor of the Prison of Elgin.	7 visits by the Governor of the Elgin Prison.	Good.	Satisfactory.	In terms of Rules.	No employment; Prison only legalized for 10 days.	None, owing to short imprisonments.	None, owing to short imprisonments.	Good.
Fife.....	Cupar, ...	Yes.	.....	51	Excellent.	Good.	According to Rules.	All employed.	Regularly attended to.	Sufficient.	Good.
	Dunfermline,...	Yes.	.....	31	Good.	Good.	According to Rules.	Suitably employed.	Regularly attended to.	Sufficient.	Good.
Forfar,.....	Dundee,.....	Yes.	.....	14	Good.	Good.	Good.	Various; viz., weaving, teasing, tailoring, shoemaking, sewing, and knitting, etc.	Visited by the Chaplain and Teacher, and the Governor occasionally instructs and reads to them.	Sufficient.	Good.
	Forfar, ...	Not in all respects.	Number of Inspections only 9.	9	Good.	Good.	Good.	Weaving, winding, teasing oakum, hair and tow strings; sewing, and knitting, tailoring and mending clothing, cooking, washing, and cleaning.	The Chaplain visits the prisoners in their cells during the week, and conducts divine service on Sundays. The Governor teaches the prisoners to read and write.	Sufficient, and regularly given in terms of Rule.	Good.
Haddington,	Haddington, ...	Yes.	.....	11	Good.	Good.	Agreeable to Rules.	Regular.	Good; attended to by Chaplain.	One hour daily.	Good.
	Dunbar,.....	Not fully.	No resident Member of the Board.	None.	Good.	Good.	Agreeable to Rules.	Not employed.	None.	.....	Good.
Inverness,	Inverness, ...	Yes.	.....	18	Good.	Good.	According to Rules.	Regular	According to Rules.	Sufficient.	Good.
	Portree, ...	Yes.	.....	21	Good.	Good.	Good.	Fully employed.	The prisoners are taught to read the Scriptures and writing.	Yes.	Good.
	Lochmaddy, ...	No.	The Prison was not inspected during the months of October and November owing to some Members of the Keeper's House being laid up with Typhus Fever—the access to the Prison being through the Keeper's House.	12	Good.	Good.	Good.	Regular.	Regular—the Chaplain was regular in his attendance except two or three times.	Yes.	Good.
	Fort-William,	Yes.	.....	18	Good.	Good.	According to Rules.	Regular.	Regular.	Sufficient.	Good.
Kincardine,	Stonehaven, ...	Yes.	.....	12	Good.	Good.	According to Prison Rules.	Picking oakum, making hair and wool mats and nets; shoemaking, tailoring, joiner work, sewing, knitting, cooking, and washing, etc.	Has been attended to.	Yes.	Good.

INSPECTION OF LOCAL PRISONS—*continued.*

NTIES.	PRISONS.	Has the Rule been observed in all respects in each Prison?	If the Rule has not been observed in all respects, state to what extent not observed, with the reason.	Total number of Inspections during the year.	General Results of Inspection in regard to							REMARKS.
					State of Buildings.	State of Prison Discipline and conduct of Officers.	Treatment of Prisoners.	Employment of Prisoners.	Instruction, Moral and Religious, of Prisoners.	Sufficiency of Exercise.	Health of Prisoners.	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
inross, ...	Kinross,.....	No.	Part of year no Prisoners.	9	Good.	Good.	*	Weaving and teasing oakum.	*	*	Good—only one prisoner under medical treatment for any length of time.	* No remarks on either of these heads in Inspector's Book.
cudbright,	Kirkcudbright,	No.	No inspection in November, January, or March.	13	Good.	Good.	Good.	All convicted employed.	Ample.	Sufficient.	Generally good.	
	Maxwelltown,	No.	Inspected in September, November, and June.	4	Good.	Good.	Good.	Partially, in consequence of short confinements.	None, except from the keeper.	Sufficient.	Good.	
nark, ...	Glasgow, ...	Yes.	.....	14 by Members of County Board, 1 by inspecting Member of the Town-Council, and 1 by Government Inspector.	Good.	In accordance with Rules.	According to Rule.	According to Rule.	According to Rule.	Sufficient.	Good.	
	Lanark, ...	Yes.	.....	14 by Members of the Prison Board, and 6 by the Superintendent of Prisons.	Good.	Good.	According to Rule.	According to Rule.	According to Rule.	Sufficient.	Good.	
	Hamilton, ...	Yes.	.....	13 by Members of Prison Board, 7 by Superintendent of Prisons, and 1 by Government Inspector.	Good.	Good.	According to Rule.	According to Rule.	According to Rule.	Sufficient.	Good.	
	Airdrie, ...	Yes.	.....	8 by Members of Prison Board, 10 by Superintendent of Prisons, & 1 by Government Inspector.	Good.	Good.	According to Rule.	According to Rule.	According to Rule.	Sufficient.	Good.	
inlithgow,	Linlithgow, ...	It has.	.....	18	Good.	Satisfactory.	According to Rules.	Shoemaking, matmaking, oakum picking, knitting, sewing, cooking, washing, crank labour, etc.	Regularly attended to.	Yes, no complaints of insufficiency.	Good.	
Cairn, ...	Nairn, ...	No.	Two visits recorded, a number of others were made. The Governor can assign no reason for their not being recorded.	Cannot be stated with certainty.	Good.	Good.	Good.	Basket making, tinsmith work, tailoring, cleaning the Prison, etc.	Strictly attended to.	Ample.	Good.	
Orkney, ...	Kirkwall, ...	No.	Prison generally empty.	4	Good.	Good.	According to Rule.	According to Rule.	According to Rule.	To the extent of the accommodation, which is limited.	Good.	
Peebles, ...	Peebles,.....	Yes.	.....	14	Good.	Good.	Good.	Regular.	Good.	Sufficient.	Good.	Register correctly kept, and everything in good order.

Perth, ...	Perth, ...	Yes.	.....	12	Good.	Good.	Good.	Good.	Good.	Sufficient.	Good.	
	Dunblane, ...	Yes.	.....	19	Good.	Good.	Good.	Good.	Good.	Sufficient.	Good.	
Renfrew, ...	Paisley, ...	Yes.	.....	20	Good.	Good.	According to Rule.	Generally employed.	Sufficient.	Well provided for.	Good.	
	Greenock, ...	Not fully observed.	.....	6	Good, but not quite secure.	Good.	According to Rule.	Employed so far as practicable.	Good.	Provided for as far as circumstances admit.	Good.	
	Pollockshaws,	Not fully observed.	Small Prison.	4	Good.	Good.	According to Rule.	Not employed.	None.	None.	Good.	
Ross and Cromarty,	Dingwall, ...	Not fully.	.....	10	Good.	Good.	According to Rule.	Various.	Yes.	Yes.	Good.	
	Tain, ...	Not fully.	.....	7	Good.	Good.	Good.	Teasing oakum and cleaning about Prison.	Good.	Yes.	Good.	
	Stornoway, Cromarty, ...	No Return.										
Roxburgh,	Jedburgh, ...	Yes.	.....	13	Prison always found in good order.	Approved of where any remark made.	Only one complaint made.	No remark made.	No remark made.	No remark made.	No remark made.	The entries of the Inspectors state generally that they found everything in good order, and no complaints.
	Hawick, ...	No.	Owing to the small number of Prisoners confined in Prison.	5 besides inspection by Governor of Jedburgh Prison.	Always found clean and in good order.	No remark made.	No remark made.	No work done in this Prison.	None given.	No remark.	No remark.	
	Kelso, ...	No.	Do.	3 besides 7 inspections by the Governor of Jedburgh Prison.	Everything in excellent order.	No remark.	No remark.	No work done in this Prison.	None given.	No remark.	No remark.	
Selkirk, ...	Selkirk, ...	Only 10 visits recorded.	.....	10 recorded visits; various visits not recorded.	Good.	Good.	Proper.	Sand-breaking, mat-making, tailoring, painting, teasing hair and wool, sewing, hard work, and Prison Service.	Religious instruction by Chaplain, and instruction by teacher when required.	Sufficient.	Good.	
Stirling, ...	Stirling, ...	Yes.	.....	12	Good.	Good.	Good.	All employed.	Good.	Sufficient.	Good.	
	Falkirk, ...	No.	No. of visits required by Rule not made, the Prison being frequently without Prisoners.	4	Tolerable.	Good.	Good.	None.	None.	None.	Good.	
Sutherland,	Dornoch, ...	Yes.	.....	22	Good.	Good.	Satisfactory.	Various.	In accordance with Rules.	Sufficient.	Good.	
Wigtown,	Wigtown, ...	Observed, so far as practicable.	The non-residence in the County of several Members of the Board during the past year has prevented the observance of the Rule in all respects.	10 visits entered in the Inspection Journal.	Good.	Good.	Humane.	Prisoners kept regularly employed.	Attended to.	Sufficient.	Good.	
	Stranraer, ...	Not fully.	Owing to the absence of Members.	8	Good.	Good.	Proper.	Teasing oakum, mat-making, making horse rugs, and sewing.	Chaplain gives religious instruction.	Yes.	Good.	
Zetland, ...	Fort-Charlotte, Lerwick.	Yes.	.....	12	Ordinary.	Good.	Good.	Hard labour and teasing oakum,	Good.	Yes.	Good.	

GENERAL PRISON.

No. VI.—Report by the Governor of the General Prison at Perth for the Year 1868; with Tables of Expenditure and State of Accounts.

General Prison, Perth, 12th January 1869.

Gentlemen,—I have the honour to submit my Annual Report of this Prison for the year 1868, together with the necessary Tables and Returns connected therewith.

I am sorry to have to state that the anticipations expressed in my Report of last year, respecting the illness of the Deputy-Governor and Steward, Mr. Cruickshank, have been realized, and that owing to the severe and hopeless nature of his disease, which altogether incapacitated him for any kind of work, his removal from his appointment became necessary.

The vacancy occasioned by Mr. Cruickshank's retirement was filled by the nomination, of the Secretary of State, of Mr. May.

PRINCIPAL OFFICERS.

To the Principal Officers my best thanks are due for the cordial support I have always received from them. They have at all times shown every readiness to assist me in carrying out the discipline of the Prison; and the mutual confidence which has existed between us, has been the means of enabling me to keep each respective department, as I venture to hope, in good order.

A vacancy occurred among the Teachers from the resignation of Mr. A. B. Fraser, who quitted the service for a more lucrative situation in Jamaica.

DISCIPLINE OFFICERS.

The Discipline Officers, with one or two exceptions, have conducted themselves in a very exemplary manner, and have performed their duties with a conscientious desire to give satisfaction to their superiors, and with a firmness, combined with discretion, which has had a beneficial effect upon the prisoners.

Of the exceptions to the general good conduct, there were two, which resulted in the resignation of the officers concerned. They were both male Warders, and had fallen into irregular habits, which must very shortly have rendered them unfit for their duties. In a third case, a male Warder was reprimanded by a Manager. One male Warder died after a protracted illness.

Among the female Warders, I am happy to say there was scarcely an instance of irregularity which required even a slight reproof.

PRISONERS.

The Prisoners as a body were fairly quiet and orderly. No very serious offences were recorded against them, nor were there any outbreaks or attempts to escape. They were very healthy, and free from all epidemic and contagious diseases. Cases of Scrofula were rather numerous, but they were mostly of long standing, and almost all of them had been in existence before the admission of the Prisoners.

There were 11 deaths, 9 in the Main Prison, and 2 in the Lunatic Department.

BUILDINGS.

The Buildings, both in the Prison and in the Village (or Officers' Quarters), are in good condition.

The Engine House for the supply of water has been rendered more effective by an addition to the house, and by the erection of a new boiler.

The old French windows in the Lunatic Department have been replaced by double-cased single-hung sashed windows.

Two rooms in the Village have been fitted up for a Library and Reading-room for the Officers; and eight Warders' quarters have been altered and enlarged.

RULES.

I certify that, to the best of my knowledge and belief, the Rules have been faithfully complied with, and that the slightest deviations from them have invariably been brought to the notice of the Managers.

I have the honour to be,

Gentlemen,

Your most obedient Servant,

FRED. S. PARKYN, *Governor.*

To the Managers of the General Prison for Scotland, Edinburgh.

The following Table is given in reference to the Trades in Prison :— (No. VI. *Continued.*)

TRADES.	Admitted during 1868.								Liberated or removed during 1868.							
	Had good knowledge of a Trade on Admission.		Had slight knowledge on Admission. Improved in the Prison.		Being taught Trades in the Prison.		Total.		Had good knowledge of a Trade on Admission.		Had slight knowledge on Admission. Improved in the Prison.		Were taught Trades in the Prison.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Tinsmith, ...	1	...	...	...	...	...	1	...	1	...	...	...	...	...	1	...
Bookbinding...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	..	...
Carpentry, ...	1	...	1	...	...	...	2	..	1	...	3	...	...	...	4	...
Matmaking, ...	...	...	11	...	90	1	101	1	2	...	11	...	95	...	108	...
Painting, ...	2	...	...	...	...	...	2	...	1	...	1	...	...	...	2	...
Shoemaking,..	1	...	25	...	10	...	36	...	3	...	7	...	22	...	32	...
Tailoring	2	...	7	...	2	...	11	...	2	...	5	...	3	...	10	...
Weaving, ...	1	...	5	...	11	...	17	...	2	...	2	...	11	...	15	...
Winding, ...	...	...	...	...	3	...	3	...	...	...	...	1	1	...	1	1
Dressmaking,	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...
Knitting, ...	...	...	...	...	...	5	...	5	...	2	...	...	...	...	...	2
Sewing,.....	...	...	...	10	...	39	...	49	...	...	...	15	...	32	...	47
Shirtmaking,	...	60	...	65	...	20	...	145	...	21	...	38	...	51	...	110
Washing,* ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Netmaking, ...	...	2	...	...	...	1	...	3	...	...	...	...	...	5	...	5
Total,...	9	62	49	75	116	67	174	204	12	23	29	54	132	88	173	165

* All the female convicts in the Second Reformatory Class are employed in rotation in washing and other household work, except those who may have forfeited the privilege, or are physically unfit for the labour.

The following Table sets forth the Distribution of the Accommodation of the Prison, and the manner in which it was occupied throughout the year :—

I.—PENAL DEPARTMENT.

1. Accommodation—	Males.		Females.		Both.
	Separation.	Association	Separation.	Association.	
Cells,	342	...	169	204	715
Average Occupation of Hospitals,	...	11	...	14	25
Total,	342	11	169	218	740

2. Occupation—	Prisoners Sentenced to Imprisonment.		Prisoners Sentenced to Transportation or Penal Servitude.		Total.		
	M.	F.	M.	F.	M.	F.	Both.
At commencement of the year,	273	148	72	204	345	352	697
Admitted during the year :—							
From Local Prisons in Scotland,	294	142	112	27	...	...	...
On Revocation of License,	...	...	...	1	...	...	...
From Convict Department, Prison of Ayr,	...	...	...	45	...	...	...
Transferred from Lunatic Department,	...	...	...	1	...	...	...
Total Admissions,	294	142	112	74	406	216	622
Deduct—							
Re-transfers of Prisoners sent to Lunatic Department during the year,	...	...	...	1	...	1	1
	294	142	112	73	406	215	621
Total number of Prisoners who have been in the Prison,	567	290	184	277	751	567	1318
Liberated during the year :—							
By Expiry of Sentence,	293	145	...	10	...	...	...
By Free Pardon,	...	1	...	...	...	...	...
By Order on License,	...	...	...	47	...	...	...
Removed to Dartmoor,	...	...	8	...	...	...	...
To Millbank,	...	...	1	...	...	...	...
To Portland,	...	...	77	...	...	...	...
To Portsmouth,	...	...	19	...	...	...	...
To Woking,	...	...	3	...	...	...	...
Transferred to Lunatic Department,	2	1	...	1	...	...	...
Died,	5	1	1	2	...	...	...
Total number of Liberations and Removals,	300	148	109	60	409	208	617
Deduct—							
Re-transfers of Prisoners sent to Lunatic Department during the year,	...	...	...	1	...	1	1
Total disposed of,	300	148	109	59	409	207	616
In custody at the end of the year,	267	142	75	218	342	360	702
Daily average during the year,	265	141	80	203	345	344	689

II.—LUNATIC DEPARTMENT.

1. Accommodation—	Males.	Females.	Both.
Apartments for	40	18	58

(No. VI. *Continued.*)

2. Occupation—	Inmates. Males.	Inmates. Females.	Both.
At commencement of the year,	31	14	45
Admitted during the year—			
From Local Prisons in Scotland,	4	2	
Transferred from the Penal Department,	2	2	
From Fife and Kinross Asylum,	1	...	
Total Admitted,	7	4	11
Total who have been in the Department,	38	18	56
Removed, viz. :—			
To Penal Department,	...	1	
,, Local Prisons,	1	1	
Died,	2	...	
Liberated,	1	...	
Total disposed of,	4	2	6
Inmates at the end of the year,	34	16	50
Daily Average during the year,	33	15	48

The average daily amount of exercise throughout the year was—
For Convicts—males, 60, females, 90 minutes. Other Prisoners—males and females, 60 minutes.

The following Table shows the conduct and punishments of all the Prisoners in custody during the year; also, the number liberated, and the number of those who received gratuities, or good-conduct money, in terms of regulations :—

Good.		Tolerable.		Bad.		Total.		Number not Punished.		Number Punished.		Number of Punishments.		Number Liberated.		Number who received Gratuities, or Good-Conduct Money.	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
706	558	42	13	39	12	787	583	592	516	195	67	451	100	294	203	281	199
1264		55		51		1370		1108		262		551		497		480	

No. VII.—Analysis of Ages and corresponding Sentences of all the Prisoners who were during the Year 1868 in the Penal Department of General Prison at Perth.

Sentences.		AGES. 12 years and under.		16 years and above 12.		21 years and above 16.		30 years and above 21.		40 years and above 30.		50 years and above 40.		60 years and above 50.		Above 60 years.		Total.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
9 months and under 12,	Imprisonment.	...	...	11	1	57	12	50	40	26	22	12	15	10	5	1	1	167	96
12 months and under 18,	Imprisonment.	...	...	9	1	73	18	79	45	49	38	20	24	6	5	4	3	240	134
18 mths. and under 2 yrs.,	Imprisonment.	...	...	9	1	41	10	52	15	25	12	7	6	7	3	2	1	143	48
2 years and upwards,	Imprisonment.	...	...	...	...	4	3	6	2	5	5	3	1	1	1	...	...	17	12
14 years,	Transportation.	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
15 years,	Transportation.	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	2
21 years,	Transportation.	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1
Life,	Transportation.	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	3
4 years,	Penal Servitude.	...	...	...	...	...	...	...	1	...	1	...	1	...	...	...	...	...	3
5 years,	Penal Servitude.	...	...	...	...	13	12	19	20	6	3	1	3	...	2	...	...	39	40
6 years,	Penal Servitude.	...	...	...	...	...	1	...	6	...	5	...	2	...	1	...	2	...	17
7 years,	Penal Servitude.	...	...	...	1	15	11	34	46	15	29	7	18	...	7	...	6	71	118
8 years,	Penal Servitude.	...	...	...	...	9	1	17	20	13	14	1	4	...	2	...	...	40	41
9 years,	Penal Servitude.	...	...	...	...	...	...	...	1	...	1	...	1	...	...	...	...	...	3
10 years,	Penal Servitude.	...	...	...	...	4	3	14	10	8	8	2	4	...	2	...	...	23	27
12 years,	Penal Servitude.	...	...	...	...	...	1	2	1	...	...	...	...	...	...	...	1	2	3
14 years,	Penal Servitude.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15 years,	Penal Servitude.	...	...	...	...	...	1	3	4	2	...	...	1	...	...	...	...	5	6
20 years,	Penal Servitude.	...	...	...	...	1	...	...	...	2	...	...	...	...	...	...	...	3	...
21 years,	Penal Servitude.	...	...	...	...	...	2	...	3	...	1	...	...	...	...	...	...	...	6
Life,	Penal Servitude.	...	...	...	...	...	2	...	3	...	...	1	1	...	...	...	...	1	6
Total,		...	...	29	4	217	78	276	218	144	144	54	81	24	28	7	14	751	567

No. VIII.—Table showing the Number of Prisoners **received** into the General Prison at Perth, and the Counties within which their Offences were committed, in the **Year ended 31st December 1868.**

Counties.	Sentenced to Imprisonment.		Sentenced to Penal Servitude.		Counties.	Sentenced to Imprisonment.		Sentenced to Penal Servitude.		Counties.	Sentenced to Imprisonment.		Sentenced to Penal Servitude.	
	M.	F.	M.	F.		M.	F.	M.	F.		M.	F.	M.	F.
Aberdeen, . .	9	9	2	4	Brt. forward,	135	48	46	26	Brt. forward,	287	138	110	69
Argyle, . . .	6	3	...	1	Haddington, .	...	...	1	...	Roxburgh, . .	1	3	...	...
Ayr, ...	4	1	3	1	Inverness, . .	4	...	1	1	Selkirk, . . .	1	...	...	...
Banff, ...	...	2	...	...	Kincardine, . .	...	...	1	1	Stirling, . . .	7	2	2	3
Berwick, . . .	2	1	...	...	Kinross, . . .	...	...	...	...	Sutherland, . .	1	...	...	...
Bute, ...	1	...	...	...	Kirkcudbright, .	...	...	1	...	Wigtown, . .	1	1	...	...
Caithness, . .	2	1	...	...	Lanark, . . .	106	65	48	28	Zetland, . . .	1	...	...	...
Clackmannan, .	3	...	1	...	Linlithgow, . .	2	1	1	...	Had Licenses Revoked, . .	...	...	...	1
Dumbarton, . .	...	...	1	...	Nairn, . . .	1	1	...	...					
Dumfries, . .	3	...	...	...	Orkney, . . .	...	...	...	...					
Edinburgh, . .	62	20	24	12	Peebles, . . .	...	...	1	...		299	144	112	73
Elgin, ...	1	...	...	1	Perth, . . .	13	3	9	1		443		185	
Fife, ...	5	2	4	1	Renfrew, . . .	26	20	1	12					
Forfar, . . .	37	9	11	6	Ross & Cromarty,	...	...	...	...	Total,	628			
Carry forward,	135	48	46	26	Carry forward,	287	138	110	69					

No. IX.—STAFF of OFFICERS and SCALE of the SALARIES in the General Prison for Scotland at Perth. Approved of by the Secretary of State.

No.		Salaries. Minimum.	Annual Increase.	Maximum.	Allowances.
	I.—MALE OFFICERS.				
1	Governor,	£450 0 0	£10 0 0	£550 0 0	Residence with Gas.
1	Deputy Governor and Steward,	200 0 0	10 0 0	300 0 0	Do.
1	Chaplain,	200 0 0	10 0 0	300 0 0	Do.
1	Visiting Roman Catholic Priest,	70 0 0	.....	70 0 0	
1	Visiting Episcopalian Clergyman,	50 0 0	.....	50 0 0	
1	Resident Surgeon,	250 0 0	10 0 0	350 0 0	Do.
1	Visiting Physician,	100 0 0	.....	100 0 0	
1	Chief Clerk,	120 0 0	4 0 0	150 0 0	Do.
1	Assistant-Clerk,	90 0 0	3 0 0	120 0 0	
3	Clerks in Steward's Department,	70 0 0	3 0 0	100 0 0	One Residence with Gas.
1	Clerk of Works,	100 0 0	5 0 0	150 0 0	Do.
1	Head Warder,	75 0 0	2 10 0	100 0 0	House, Gas, and Uniform.
2	Trades' Warders,	55 0 0	2 0 0	75 0 0	Do.
1	Scripture Reader,	100 0 0	3 0 0	130 0 0	
5	Teachers,	70 0 0	2 0 0	90 0 0	
30	Warders,	52 0 0	1 0 0	62 0 0	22 House, Gas, and Uniform, and 8 Uniform.
1	Messenger,	40 0 0	1 0 0	50 0 0	Uniform.
	Allowance to Teacher of Music (a Warder),	8 0 0	.....	8 0 0	
	Allowance to Precentor (a Warder),	8 0 0	.....	8 0 0	
1	Labourer in Store,	35 0 0	1 0 0	45 0 0	Uniform.
54					
	II.—FEMALE OFFICERS.				
1	Matron or Superintendent,	175 0 0	5 0 0	225 0 0	Furnished Residence with Gas.
1	Sub-Matron,	80 0 0	4 0 0	120 0 0	Do.
2	Scripture-Readers,	75 0 0	2 0 0	95 0 0	
7	*Teachers,	55 0 0	1 0 0	65 0 0	
1	Superintendent of Convicts, viz., of Work,	52 0 0	1 0 0	62 0 0	Furnished Lodgings and Gas.
23	Warders,	35 0 0	1 0 0	45 0 0	Furnished Lodgings, Gas, and Uniform.
1	Outer Gatekeeper (a Warder's wife),	15 0 0	.....	15 0 0	Uniform.
1	Sick Nurse,	45 0 0	1 0 0	55 0 0	Furnished Lodgings, Gas, and Uniform.
1	Housekeeper to Female Warders,	40 0 0	1 0 0	50 0 0	Furnished Lodgings and Gas.
38					
	III.—SPECIAL TO LUNATIC DEPARTMENT.				
	Male Officers.				
1	Superintendent,	120 0 0	5 0 0	150 0 0	House with Gas.
1	Senior Warder,	62 0 0	1 0 0	72 0 0	4 House, Gas, and Uniform, and 3 Uniform.
6	Warders	52 0 0	1 0 0	62 0 0	
	Female Officers.				
1	Senior Warder,	43 0 0	1 0 0	53 0 0	Furnished Lodgings, Gas, and Uniform.
2	Warders	35 0 0	1 0 0	45 0 0	
11					

* One doing duty in the Prison of Ayr.

No. X.—View of the Outlay connected with the Prisoners' Labour and of the Returns therefrom for the Year ended 31st December 1868.

Work.—Debtor.	£ s. d.	£ s. d.	£ s. d.
I. To value of Stock on hand at 31st December 1867, viz.:—			
1. Undisposed of Goods,	544 15 10		
2. Material,	923 4 4		
3. Tools and Implements,	178 4 4		
		1646 4 6	
II. To Outstanding Accounts for Sales and Work executed at 31st December 1867, brought from last year's account,	...	1008 17 0	
III. To Outlay this year for Material, Implements, and Carriage of Goods, viz.:—			
Material, &c.,	4441 13 1		
Implements,	39 6 11		
		4481 0 0	
Sum of Debit,		7136 1 6	

Creditor.	£ s. d.	£ s. d.	£ s. d.
I. By Loss on Outstanding Accounts of 1867 and previous years, being Abatements, and Losses at Settlement, by Composition on Bankrupt Estates, &c.,		3 12 10	
II. By Goods returned by Purchasers and Employers on Accounts incurred in 1867,		1 9 3	
III. By Receipts by the Governor, viz.:—	£ s. d.		
1. Outstanding Accounts of 1867 and previous years,	912 15 5		
2. For Sales and Work executed to Purchasers and Employers during the year 1868,	4501 2 5		
		5413 17 10	
IV. By Current Expenses of the General Prison, viz.:—			
1. Value of Material, &c., issued for the use of the Prison,	1003 14 9		
		1003 14 9	
V. By Outstanding Accounts due by Purchasers and Employers, at 31st December 1868, viz.:—			
1. For Sales and Work executed in 1867, and previous years,	90 19 6		
2. For Sales and Work executed in 1868,	761 5 9		
		852 5 3	
VI. By Value of Stock on hand at 31st December 1868, viz.:—			
1. Undisposed of Goods,	1357 1 1		
2. Material,	877 15 7		
3. Implements of Labour,	144 14 6		
		2379 11 2	
Sum of Credit,	...		9654 11 1
Balance, being nett available profits this year,			£2518 9 7

No. XI.—Table showing, in classified form, the Expenditure of the General Prison at Perth, and the total Cost of each Prisoner in the year ended 31st December 1868.

No.	HEAD OF SERVICE.	Value of Stock on hand at 31st December 1867.	Outlay for the year.	Gross Expenditure for the year.	Deduct Stock on hand at 31st December 1868.	Nett Expenditure for the year.	Yearly cost per Prisoner, the average number in custody being 737.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1.	Salaries and Wages,	...	7424 4 9	7424 4 9	...	7424 4 9	10 1 6
2.	Uniforms for Officers,	...	237 15 7	237 15 7	...	237 15 7	0 6 5
3.	Victualling for Prisoners,	23 16 8	5641 10 7	5665 7 3	18 13 1	5646 14 2	7 13 3
4.	Clothing for do.,	0 10 6	955 5 2	955 15 8	0 10 6	955 5 2	1 5 11
5.	Bedding for do.,	0 11 10	179 7 7	179 19 5	4 10 0	175 9 5	0 4 9
6.	Medicines, Surgical Instruments,	...	85 13 2	85 13 2	...	85 13 2	0 2 4
7.	Gratuities to Prisoners,	...	754 0 7	754 0 7	...	754 0 7	1 0 5
8.	Furniture, Kitchen Utensils, etc.,	0 15 7	187 3 10	187 19 5	0 9 7	187 9 10	0 5 1
9.	Fuel and Light,	140 16 10	1101 13 6	1242 10 4	132 16 0	1109 14 4	1 10 1
10.	Soap, Scouring and Cleaning Articles,	...	265 3 9	265 3 9	...	265 3 9	0 7 2
11.	Rent,	...	190 2 0	190 2 0	...	190 2 0	0 5 2
12.	Rates and Taxes,	...	11 14 0	11 14 0	...	11 14 0	0 0 4
13.	Escort and Conveyance of Prisoners	...	122 14 1	122 14 1	...	122 14 1	0 3 4
14.	New Buildings and Alterations,	...	1228 5 3	1228 5 3	...	1228 5 3	1 13 4
15.	Ordinary Repairs of Buildings,	...	579 5 1	579 5 1	...	579 5 1	0 15 9
16.	Incidental Expenses,	...	158 10 1	158 10 1	...	158 10 1	0 4 4
		166 11 5	19122 9 0	19289 0 5	156 19 2	19132 1 3	25 19 2
	Manufacturing Department.						
	1. Material,	...	4470 10 0	...			
	2. Implements,						
			23592 19 0	...			
	Deduct:—						
	1. Profits arising from Labour of Prisoners,				2518 9 7		
	2. Incidental Receipts (Sales of Old Stores), etc.,				121 6 2		
						2639 15 9	3 11 8
	Nett Total of current Expenses and cost per Prisoner,					16492 5 6	22 7 6

Note.—Under the new method of keeping the accounts the earnings of Prisoners for Prison services are not credited, and therefore are not included in the gross earnings as in former years. The amount is £1, 1s. 6d. per head.

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No. XII.

REPORT by the Rev. WILLIAM BROWN, Chaplain of the General Prison at Perth, for the Year 1868.

General Prison, Perth, 8th January 1869.

SIR,—In submitting, through you, for the consideration of Her Majesty's Prison Managers for Scotland, this my Twenty-fourth Annual Report—a Digest of Transactions in the Chaplain's Department for the year 1868, I have the honour to state that the Rules applicable to the duties assigned me have been anxiously and faithfully carried out.

The following Table shows the number and classes of Prisoners—male and female—admitted and re-admitted during the year :—

PRISONERS.	Sentenced to									Lunatic Criminals.			Grand Total.		
	Imprisonment.			Transportation.			Penal Servitude.								
	Males.	Fms.	Total.	Males.	Fms.	Total.	Males.	Fms.	Total.	Males.	Fms.	Total.	Males.	Fms.	Total.
Admitted, ...	294	142	436	...	...	...	112	73	185	5	2	7	411	217	628
Re-admitted, ...	49	45	94	...	...	...	54	61	115	...	...	...	103	106	209

The re-admitted Prisoners, in all 209—103 Males and 106 Females—(including 74 who had been here —26 Males and 34 Females twice, 4 Males and 7 Females thrice, and 1 Male and 2 Females four times) left the Prison :—*The Males*, 1 in 1852, 1 in 1854, 3 in 1855, 1 in 1856, 6 in 1857, 2 in 1858, 1 in 1859, 5 in 1860, 1 in 1861, 2 in 1862, 6 in 1863, 7 in 1864, 6 in 1865, 17 in 1866, 31 in 1867, and 13 in 1868 ; *the Females*, 1 in 1846, 3 in 1858, 2 in 1860, 4 in 1861, 6 in 1862, 8 in 1863, 14 in 1864, 17 in 1865, 14 in 1866, 27 in 1867, and 10 in 1868. Of the re-admitted Females, one, c/n. 485/27, having forfeited her Order of License, was returned to complete her sentence.

The number of Prisoners in custody at the close of the year was 752—376 Males and 376 Females. Of these, 298 had been in the General Prison before—87 Males and 211 Females. The whole were classified thus :—

IN THE MAIN PRISON AND SUBSIDIARY WARDS.	Under Charge.			Re-Admissions.		
	Males.	Females.	Total.	Males.	Females.	Total.
Sentenced to—						
Imprisonment (*a*)	267	142	409	51	49	100
Transportation (*b*)	...	4	4	...	3	3
Penal Servitude (*c*)	75	214	289	34	156	190
Lunatic Criminals (*d*)	34	16	50	2	3	5
Total,.....	376	376	752	87	211	298

References :
(*a*) Males and females from 9 months, to periods not exceeding two years.
(*b*) Females, from 15 to 21 years, one for life; three—c/ns. 293/20, 385/21, 121/25—having forfeited their order of license, were returned to complete their sentence.
(*c*) Males from 5 to 15 years, and females from 5 to 21 years—6 for life; 3 females—c/ns. 191/26, 513/26, 485/27,—having forfeited their order of license, were returned to complete their sentence.
(*d*) Including 5 males—c/ns. 146/23, 272/23, 485/23, 232/25, 4/26, and 4 females—c/ns. 88/15, 69/20, 441/23, 548/27—insanity having supervened since their admission.

The registered antecedents of our inmates as to previous imprisonments, in Local Prisons and in the General Prison, are indicated in the following Table :—

PREVIOUS IMPRISONMENTS—IN LOCAL OR OTHER PRISONS.

Number of times in Prison, . .	0		1		2		3		4		5		6		7		8		9		10		12		14		17		20		24		29		31		34		42		50		52		54		67		86		Total.	
SEXES.	M.	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M	F.	M.	P.
No. of Prisoners to each number of times, . .	151	61	57	28	41	30	39	42	27	43	16	39	13	32	8	20	1	20	6	11	5	11	5	6	5	7	2	4	..	3	..	2	..	5	..	2	..	2	..	3	..	1	..	1	..	1	..	1	1	376	376
	212		85		71		81		70		55		45		28		21		17		16		11		12		6		3		2		5		2		2		3		1		1		1		1		752	

PREVIOUS IMPRISONMENTS—In the General Prison at Perth.

(No. XII. *Continued.*)

Number of times in Prison, ...	0		1		2		3		4		Total.	
SEXES.	Males.	Fms.	Males.	Fms.	Males.	Fms.	Males.	Fms.	Males.	Fms.	Males.	Fms.
Number of Prisoners to each number of times, ...	289	165	61	117	22	81	3	10	1	3	376	376
	454		178		103		13		4		752	

The following Table gives a comparative view of the state as to Education, on Admission, and on the 31st of December, of 539 Prisoners—255 males and 284 females—who have been here for three months and upwards:—

		Could not read at all.		Could read with difficulty.		Could read well, that is, could read any common book easily.		Could not write at all.		Could sign their name merely.		Could write with difficulty.		Could write well.		Had a knowledge of Arithmetic.		Improved in other branches of Instruction.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
122 Males and 29 Females have received instruction for three months, but for less than six months, ...	On admission,	16	10	27	12	79	7	29	22	2	...	45	6	46	1	59	...	...	...
	On 31st December,	3	6	25	14	94	9	7	14	2	4	47	10	66	1	74	2	...	...
80 Males and 82 Females have received instruction for six months, but for less than one year, ...	On admission,	7	13	26	34	47	35	17	30	5	10	35	38	23	4	31	7	...	...
	On 31st December,	2	7	15	31	63	44	4	13	2	4	31	50	43	15	58	17	...	...
53 Males and 173 Females have received instruction for one year and upwards, ...	On admission,	7	27	15	63	31	83	12	48	3	24	24	88	14	13	23	11	...	...
	On 31st December,	5	13	11	51	37	109	9	22	...	17	20	89	24	45	31	31	...	...

The Educational Statistics are carefully prepared, and show satisfactory progress on the part of the Prisoners, who are from time to time examined by myself, individually, as to their attainments, in presence of their respective Teachers.

The Prisoners are, in a Religious point of view, well attended to,—there being no lack of spiritual instructors. As respects those who give attendance to my ministrations in the Chapel on Sabbaths and on Week-days, I am free to state that their deportment is most becoming, not less so than that of any ordinary congregation. My periodical and occasional visits, moreover, to all the Prisoners are invariably well received. It ought to be observed, however, that our inmates, as to statement of Creed—recorded in Authorized Form—are not always to be trusted; many of them, indeed, not having been accustomed to attend any place of Worship—to listen to or even read the Word of God, until they entered the precincts of a Prison.

The Library—ample and select—is an additional source of instruction to the reading portion of the Prisoners.

The number of Prisoners discharged during the year was 618—411 males and 207 females, including 8 males and 3 females by death. Of the males, 108 Convicts were removed to Public Works in England.

The Table appended gives a comparative view of their Educational state, as on admission and at departure, with their ages and sentences. With reference to this Table, it is necessary to remark that the attainments of the male Convicts, who are eligible for removal to Public Works on the expiry of nine months (probationary period) from the date of conviction, are inserted in the respective columns of Sentences, according to the time actually passed by them in the General Prison.

Of 295 liberated male Prisoners (exclusive of the 8 by death, and the 108 Convicts removed to Public Works), 116 are entered in my register as expected to do well, and 135 as having obtained employment. Of those released prior to 1868, I also ascertained that 46 had, in addition to the number already reported on, got work. Of 204 discharged females (exclusive of the 3 by death), 24 are recorded by the Matron hopeful as to their future career; 38 got employment; 115 had friends willing to receive them; 11 went to Houses of Refuge, and 3 to the Colonies.

My correspondence and interviews with out-gone prisoners and their friends, during the past year, have been attended with favourable results.

Mr. Alexander Fraser, Teacher, having received a Colonial appointment, ceased his connexion with the Prison on the 29th of February.

I have the honour to remain, Sir, your most obedient Servant,

William Brown, *Chaplain.*

To John Hill Burton, Esquire, LL.D.,
etc. etc. etc.

(No. XII. *Continued.*)

COMPARATIVE VIEW of the Educational State of Prisoners discharged during the year, as on Admission and Departure, with their Ages and Sentences.

MALE DEPARTMENT.—On Admission (A.) and at Departure (D.)

	RECORDED AGES ON COMMITTAL.														SENTENCES.							
	Juveniles.*		15 years and under 20.		20 Years and under 25.		25 Years and under 30.		30 Years and under 40.		40 Years and upwards.		Total.		12 Months and under.		18 Months and above 12.		Above 18 Months.		Total.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Could not read,.....	2	1	7	...	6	1	8	4	8	1	5	1	36	8	28	5	6	2	2	1	36	8
Could read a little, ...	1	1	25	15	25	12	18	9	26	17	14	10	109	64	84	51	23	11	2	2	109	64
Could read well, ...	1	2	49	66	64	82	47	60	60	76	45	53	266	339	202	258	55	71	9	10	266	339
Total,.....	4	4	81	81	95	95	73	73	94	94	64	64	411	411	314	314	84	84	13	13	411	411
Could not write, ...	3	2	14	1	15	3	8	4	16	5	10	4	66	19	49	14	14	4	3	1	66	19
Could sign name merely,	...	...	3	1	4	3	1	2	1	3	1	4	10	13	8	8	2	5	...	...	10	13
Could write a little, ...	1	1	48	34	49	33	41	22	49	32	30	16	218	138	165	109	48	25	5	4	218	138
Could write well, ...	...	1	16	45	27	56	23	45	28	54	23	40	117	241	92	103	20	50	5	8	117	241
Total,.....	4	4	81	81	95	95	73	73	94	94	64	64	411	411	314	314	84	84	13	13	411	411
Could not cipher,.....	3	3	54	16	56	30	47	27	68	39	39	28	267	143	208	110	53	29	6	4	267	143
Could cipher a little, ...	1	...	18	36	27	32	18	23	16	26	16	15	96	132	67	104	23	24	6	4	96	132
Could cipher well,†	...	1	9	29	12	33	8	23	10	29	9	21	48	136	39	100	8	31	1	5	48	136
Total,.....	4	4	81	81	95	95	73	73	94	94	64	64	411	411	314	314	84	84	13	13	411	411

FEMALE DEPARTMENT.—On Admission (A.) and at Departure (D.)

	RECORDED AGES ON COMMITTAL.														SENTENCES.							
	Juveniles.*		15 Years and under 20.		20 Years and under 25.		25 Years and under 30.		30 Years and under 40.		40 Years and upwards.		Total.		12 Months and under.		18 Months and above 12.		Above 18 Months.		Total.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Could not read, ...	...	...	6	...	8	3	9	5	7	4	5	1	35	13	20	8	11	3	4	2	35	13
Could read a little, ...	...	...	6	6	14	13	16	14	22	14	9	10	67	57	36	31	17	18	14	8	67	57
Could read well, ...	...	...	7	13	16	22	21	27	26	37	35	38	105	137	45	62	30	37	30	38	105	137
Total,.....	...	...	19	19	38	38	46	46	55	55	49	49	207	207	101	101	58	58	48	48	207	207
Could not write, ...	...	...	8	...	13	6	17	8	23	6	21	7	82	27	46	16	26	6	10	5	82	27
Could sign name merely,	...	...	2	2	3	3	2	3	3	2	2	5	12	15	9	6	2	7	1	2	12	15
Could write a little, ...	...	...	8	10	18	19	25	23	27	32	22	27	100	111	43	63	26	30	31	18	100	111
Could write well, ...	...	...	1	7	4	10	2	12	2	15	4	10	13	54	3	16	4	15	6	23	13	54
Total,.....	...	...	19	19	38	38	46	46	55	55	49	49	207	207	101	101	58	58	48	48	207	207
Could not cipher,.....	...	...	18	10	35	27	42	33	53	46	49	47	197	163	96	84	56	44	45	35	197	163
Could cipher a little, ...	...	...	1	8	3	11	4	11	2	7	...	2	10	39	5	15	2	12	3	12	10	39
Could cipher well,†	...	...	...	1	...	...	...	2	...	2	...	...	...	5	...	2	...	2	...	1	...	5
Total, ...	...	...	19	19	38	38	46	46	55	55	49	49	207	207	101	101	58	58	48	48	207	207

* Prisoners under 15 years.

† In simple proportion, or the higher rules of arithmetic.

Of these—

Males.	Females.	
8	13	Did not learn to read.
28	22	Learned to read.
373	172	Improved in reading.
2	...	Were well educated on admission.
411	207	
19	27	Did not learn to write.
13	15	Learned to sign name merely.
44	52	Learned to write.
333	113	Improved in writing.
2	...	Were well educated on admission.
411	207	
143	163	Did not learn to cipher.
124	34	Learned to cipher.
142	10	Improved in ciphering.
2	...	Were well educated on admission.
411	207	

No. XIII.

Report by J. B. Thomson, Resident Surgeon to the General Prison for Scotland at Perth, for the year ending 31st December 1868.

General Prison for Scotland, Perth, 20th January 1868.

Gentlemen,—I have the honour to lay before you my Annual Report of the general health, sickness, and deaths; also of the mental condition of prisoners in this Prison during the past year.

I. Of the General Health, Sickness, and Deaths of Prisoners.

II. Of the Mental Condition of Prisoners not in the Lunatic Department.

III. Of the Department for Criminal Lunatics.

I. The general health of prisoners has been good throughout the year. General Health

The kinds of illness have been, as usual, of a chronic character, the results of hereditary deterioration, bad habits of life, and long and frequent imprisonments. Kinds and Caus Illness.

No Epidemic diseases have visited us during 1868.

The ventilation and hygienic arrangements are satisfactory, and the scale of Dietaries, although somewhat reduced in 1866, seems ample, in as much as it has not been attended by any of those prison Diseases at one time prevalent from defective alimentation. I must state, however, that a few cases of scrofula have been admitted here from Local Prisons, that would appear to have been engendered there. Scrofula from I Prisons.

The cases placed on the Sick Register were as follows:— Number of Pris on Sick Registe

	Sentenced to Imprisonment.		Convicts.		Total.
	M.	F.	M.	F.	
On Register at commencement of 1868,	6	2	1	4	13
Put on during the year,	29	8	8	23	68
Total during the year,	35	10	9	27	81
Of whom removed,	33	6	9	25	73
Leaving at 31st December 1868,	2	4	...	2	8

These cases when analysed showed—

Slightly ill,	30
Seriously ill,	38
	68
The Diseases contracted before admission,	34
Do. after do.,	34
	68

In addition to the above 68 cases of sickness, we had childbed cases:— Childbed Cases

Imprisonment Prisoners,	10
Convicts,	4

The mothers all made good recoveries; one child was still-born.

Four nursing-mothers were admitted in the course of the year. These were imprisonment Prisoners.

Of the female Convicts admitted since October 1855, I offer the following particulars:— Number of Dea

Died in all,	50

Time in Prison:— Time in Prison.

Under 6 months,	9
6 months, and under 1 year,	8
1 year, and under 2 years,	9
2 „ „ 3 „	13
3 „ „ 4 „	4
4 „ „ 5 „	4
5 „ and upwards,	3
	50

Table of ages :—

Under 20 years,	4
20 years and under 30,	22
30 „ 40,	13
40 „ 50,	7
50 „ 60,	4

Diseases.

Diseases fatal to female Convicts :—

Phthisis,	13	Dropsy,	2
Worn-out,	7	Syphilis,	2
Brain Disease,	4	Paralysis,	2
Scrofula,	4	Pericarditis,	1
Hæmoptysis,	2	Aneurism,	1
Heart Disease,	2	Pneumonia,	1
Uterine Disease,	3	Menorrhagia,	1
Gradual Decay from Insanity,	2	Gastric Fever,	1
Congestion of Lungs,	1	Liver Disease,	1

With the exception of one Prisoner, who has had frequent attacks of acute mania, none of this class have become insane during 1868.

ts of Female ts at liberation.

The next Table gives the weights of all Female Convicts liberated by remission or by expiry of sentence, showing the percentage who had not lost weight at liberation :—

	Numbers.	Stationary.	Gaining.	Losing.	Percentage. Who had not Lost Weight.
Liberated up to 31st December 1860, excluding Sick,	180	14	93	73	
Do. do. 1861, do.	90	4	51	35	
Do. do. 1862, do.	66	2	39	25	
Do. do. 1863, do.	82	4	41	37	
Do. do. 1864, do.	49	1	25	23	
Do. do. 1865, do.	68	7	25	36	
Do. do. 1866, do.	81	3	34	44	
Do. do. 1867, do.	61	7	20	34	
Do. do. 1868, do.	58	4	18	36	
	735	46	346	343	53·3

The above Table shows that since 1865 more had lost than gained in weight. In a former Report, I stated that this might be partly accounted for by the fact that the earlier period of Convict imprisonment is undergone in Ayr prison, and our experience has uniformly been that increase of weight takes place during the first and second years of imprisonment, but the tendency is to fall off after that time : consequently they may have attained more than their original weight when sent here, and then decreased. I have also observed, in female Convicts especially, an excitement a few months before liberation, that exhausts and reduces the body in weight.

Further, I may notice, that since the abolition of Transportation, a large proportion of Convicts have undergone two or three sentences of Penal Servitude, or imprisonment, at short intervals, and these return here worn out by long and frequent imprisonments.

The daily average number of female Convicts last year was 203. The deaths were 2, and the amount of sickness among them was not in excess of former years.

The imprisonment males and females have maintained good general health.

s of Male ts.

The following Table of Weights of male Convicts is satisfactory :—

	Number weighed.	Stationary.	Gaining.	Losing.	Percentage. Who had not Lost Weight.
Transferred to England in 1863,	49	2	36	11	
Do. in 1864, exclusive of Sick,	96	3	80	13	
Do. in 1865, do.	81	3	66	12	
Do. in 1866, do.	92	2	61	29	
Do. in 1867, do.	106	2	77	27	
Do. in 1868, do.	108	3	74	31	
	532	15	394	123	76·8

DISEASES for which Prisoners were treated during the decennial period 1859 to 1868 inclusive.

Total Diseases 1859-1868.

DISEASES.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	Total.
I. *Zymotic Class*—											
Scarlatina,	...	...	...	2	...	...	...	...	...	...	2
Diarrhœa and Dysentery,	13	6	6	3	5	6	4	5	3	2	53
Influenza,	...	3	...	1	4	2	5	...	2	1	18
Scurvy,	1	...	...	...	...	...	1	...	...	...	2
Erysipelas,	1	2	...	...	...	1	2	...	...	...	6
Syphilis,	4	10	3	4	...	2	2	5	...	2	32
Condylomata,	...	...	...	1	...	..	...	...	...	...	1
Chicken Pox,	1	1	...	...	1	...	...	...	...	...	3
Measles,	...	...	1	...	...	...	...	...	...	...	1
Fever,	...	...	1	1	5	2	...	1	...	...	10
Cholera, Asiatic,	...	...	...	...	...	...	...	2	...	...	2
II. *Constitutional*—											
Fistula,	1	2	...	1	...	1	2	...	...	1	8
III. *Tubercular*—											
Scrofula,	7	6	7	3	5	3	2	3	5	5	46
Phthisis,	3	5	5	5	3	6	2	5	14	4	52
IV. *Of Nervous System*—											
Apoplexy,	...	...	...	1	...	1	...	2	...	...	4
Paralysis,	1	2	3	3	2	2	3	3	1	2	22
Brain Disease,	1	3	2	...	3	3	...	3	3	...	18
Hysteria,	1	...	...	2	2	...	2	...	1	...	8
*Epilepsy,	...	...	...	...	...	...	...	...	...	...	...
Ophthalmia,	...	2	2	1	2	...	1	2	...	1	11
V. *Of Organs of Circulation*—											
Heart,	2	1	...	1	3	1	...	...	1	1	10
Aneurism,	1	...	...	...	...	...	...	...	...	...	1
Syncope,	...	...	...	...	...	1	...	...	...	...	1
Pericarditis,	2	...	...	...	...	...	...	...	...	...	2
VI. *Of Respiration*—											
Bronchitis,	4	4	3	...	...	1	4	3	8	...	27
Pleuritis,	3	4	...	...	...	1	...	...	1	3	12
Pneumonia,	...	2	4	2	3	...	...	2	...	4	17
Asthma,	3	2	2	...	1	...	1	...	...	2	11
Hæmoptysis,	4	3	3	...	3	...	...	3	2	2	20
Hydrothorax,	...	2	...	...	...	...	...	...	...	...	2
VII. *Of Digestion*—											
Epistaxis,	1	...	1	...	...	...	...	...	...	...	2
Quinsey,	1	2	...	...	...	...	1	...	...	1	5
Dyspepsia,	4	3	6	3	5	3	7	5	2	4	42
Enteritis,	1	1	...	1	...	1	...	1	...	2	7
Ascites,	...	1	1	...	2	...	1	...	...	...	5
Ulcer of Intestines,	...	...	...	1	2	1	...	...	...	...	4
Hernia,	1	...	1	...	1	...	1	...	...	...	4
Hæmatemesis,	2	2	...	..	1	...	...	2	1	...	8
Hæmorrhoids,	2	...	...	...	...	1	...	...	...	1	4
Constipation,	...	...	1	...	1	...	...	...	...	...	2
Hepatitis,	...	3	1	...	...	...	...	...	2	2	8
Cancer of Stomach,	...	1	...	...	1	...	...	...	...	...	2
VIII. *Of Urinary and Generative Organs*—											
Stricture, &c., of Urethra,	1	2	...	...	3	...	...	2	...	...	8
Gonorrhœa,	3	3	...	1	3	1	2	...	...	...	13
Testitis,	3	...	1	2	...	...	1	3	...	2	12
Hydrocele,	1	...	...	...	2	1	1	...	...	...	5
Masturbatio,	2	1	...	...	1	...	...	...	...	...	4
Bright's Disease,	...	...	...	...	...	2	...	1	1	...	4
Perineal Abscess,	...	...	...	...	...	...	...	...	...	2	2
IX. *Of Uterine Organs*—											
Cancer Uteri,	1	...	...	...	1	...	...	1	1	...	4
Uteritis,	1	...	2	3	1	...	...	...	...	...	7
Menorrhagia,	3	0	1	2	2	1	3	1	...	3	22
Polypus,	...	...	1	...	..	...	...	...	...	...	1
X. *Of Locomotive Organs*—											
Rheumatism,	3	4	...	3	3	3	3	2	2	4	27
Sciatica,	2	1	...	...	...	...	...	1	2	...	6
Carry forward,	85	90	58	47	71	47	51	58	52	51	610

* See Table No. XVI. as to Epileptics.

DISEASES.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	Total.
Brought forward,	85	90	58	47	71	47	51	58	52	51	610
XI. *Of Skin*—											
Ulcer,	6	5	...	2	2	...	5	...	5	2	27
Abscess,	4	6	5	...	3	3	13	5	3	11	53
Itch,	4	2	4	4	6	4	6	2	1	1	34
Ringworm, &c.,	4	...	...	...	...	...	...	...	...	...	4
Favus,	2	...	...	1	...	1	...	...	...	...	4
Pediculi,	2	...	...	...	...	...	...	...	...	...	2
Anomalous Eruption,	1	...	1	2	...	1	...	...	1	...	6
Eczema,	...	2	1	2	...	...	1	2	...	...	8
Lepra,	...	...	1	1	2	...	...	...	...	...	4
XII. *From Accident and Negligence*,—											
Burns and Bruises,	2	3	1	1	2	...	1	1	...	1	12
Fracture,	1	2	...	2	1	...	...	...	...	...	6
Sprains,	...	2	...	2	...	...	3	1	2	1	11
Wounds,	1	2	2	2	2	1	...	1	...	...	11
Old Age, and worn-out,	...	...	...	...	...	...	...	1	6	1	8
	112	114	73	66	89	57	80	71	70	68	800

s of Prisoners, 1868.

Table showing the daily average population, the number and percentage of deaths during twenty-six years, viz., since 1842, when the General Prison was opened, to 1868 inclusive :—

Years.	Daily average Population.	Annual Deaths.	Years.	Daily average Population.	Annual Deaths.
1842	404	5	1856	583	11
1843	278	6	1857	593	12
1844	217	3	1858	561	10
1845	233	3	1859	632	12
1846	322	7	1860	675	16
1847	332	1	1861	637	8
1848	301	5	1862	688	5
1849	363	2	1863	714	8
1850	385	3	1864	692	15
1851	306	4	1865	693	2
1852	434	8	1866	719	9
1853	459	4	1867	732	17
1854	580	9	1868	737	11
1855	498	10	...	...	...

The daily average population during 27 years being added up, the sum total makes 13,768, while the sum total of the deaths is 206, showing the average rate of deaths per annum to be about 1.5 per cent., or 15 per 1000.

Causes of D 1842-68.

FATAL DISEASES OR CAUSES OF DEATH.	1842.	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	T
Zymotic Class—																												
Diarrhœa and Dysentery,	...	...	...	...	...	...	1	...	...	...	...	...	3	...	...	...	...	...	2	...	...	...	1	...	...	1	...	8
Influenza,	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Scurvy,	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Cholera, British	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	1
Fever,	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	2
Cholera, Asiatic,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	2
Tubercular—																												
Scrofula,	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	1	...	1	1	...	...	1	...	...	2	...	9
Phthisis,	4	2	2	...	4	1	2	1	...	...	1	...	3	5	4	1	4	4	3	1	4	...	4	1	1	7	2	61
Marasmus,	1	...	...	...	1	...	...	1	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Syphilis,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	2
Of Nervous System—																												
Paralysis,	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	1	1	...	1	1	...	...	...	1	7
Brain disease,	...	...	...	...	...	...	...	...	...	...	2	...	...	...	2	...	...	...	1	1	...	...	2	...	1	2	...	11
Decay from Insanity,	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...	3	...	...	...	1	...	1	1	...	...	...	...	9
Epilepsy,	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	3
Apoplexy,	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	..	...	2
Delirium Tremens,	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Of Organs of Circulation—																												
Heart,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	1	1	1	1	...	1	...	...	...	...	...	7
Pericarditis,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
Aneurism,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
Syncope,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1
Congestion of Lungs,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	2
Of Respiration—																												
Bronchitis,	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	1	1	...	...	...	...	...	...	...	1	5
Pneumonia,	...	1	...	...	...	...	...	...	...	1	2	...	...	...	...	...	1	...	...	...	...	2	...	...	1	...	...	8
Asthma,	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	2
Hæmoptysis,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	1	...	3
Hydrothorax,	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	1	4
Of Digestion—																												
Epistaxis,	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Enteritis,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
Peritonitis,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
Hæmatemesis,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
Constipation,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
Cancer of Stomach,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1
Ascites,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	1	3
Liver Disease,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	3
Of Urinary and Generative Organs—																												
Cancer Uteri,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	1	...	1	...	...	...	1	...	5
Bright's disease,	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Menorrhagia,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	1	3
Perineal Abscess,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Of Organs of Locomotion—																												
Rheumatism,	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Suicides,	...	...	...	...	...	...	...	...	...	1	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	3
Scalding by Hot Water,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Unknown,	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2
Old Age,	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	..	...	...	1	...	...	...	...	2
Worn-Out,	...	1	...	...	...	...	...	...	1	...	1	...	...	3	...	4	...	2	1	...	1	...	1	...	..	1	...	16
	5	6	3	3	7	1	5	2	3	4	8	4	9	10	11	12	10	12	16	8	5	8	15	2	9	17	11	206

II. Of the mental condition of Prisoners not in the Lunatic Department.

Number asso

Table No. XVI gives the particulars of all placed, by the Surgeon's authority, in association, as unfit for separation, with the reasons for association in each case, viz.:—

Imbecile from Age, ...	1
Do. from other causes, ...	22
Do. and Suicidal, ...	1
Epileptic, ...	6
In all, . .	30

A large proportion of these seem to have been congenitally weak-minded—3 had been insane, and associated by way of precaution against a relapse.

Besides the above, we had under special observation, at 31st December,—

Weak-minded,	15
Do. and Suicidal,	16
Total,	31

The number associated on mental grounds during the last ten years was as under :—

	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	Totals.
Mental Condition—											
Juvenile, Imbecile, or Weak-minded,.....	21	20	16	26	13	17	15	32	39	23	222
Do. and Suicidal,.....	4	7	9	6	2	4	1	4	1	1	39
Epileptic,.....	11	2	7	13	6	15	7	12	10	6	89
	36	29	32	45	21	36	23	48	50	30	350

A large proportion of this weak-minded class seem to have been congenitally depraved in mind and body.

III. Of the Department for Criminal Lunatics.

The general health of this class has been good; two only appearing on the Death Report for the past year.

In Table No. XIV. the particulars are set forth of all confined in this department during 1868; 38 males and 18 females—making in all 56.

Admissions during 1868—7 males and 4 females: 2 from the Prison of Glasgow, 1 from Edinburgh, Aberdeen, Dundee, Jedburgh, and the Fife and Kinross Asylum; also 4 from the General Prison Penal Department.

Removals :—

	M.	F.	Total.
Recovered, and returned to Main Prison,	0	1	1
Sent back to the prisons whence they came,	1	1	2
Handed to Inspector of Poor, Perth,	1	0	1
Died,	2	0	2
	4	2	6

One of these Deaths requires special notice :—J. M., c/n. 548/27, left the breakfast table before the other prisoners, and entered the bath-room, the door of which was improperly left open, and he was found sitting in the hot-water boiler, and so scalded, that he died of the shock.

Table of admissions during the last decennial period :—

	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	Totals.
From the General Prison, ...	6	6	4	2	3	3	9	7	6	4	50
From other Prisons or Asylums,.....	8	2	1	3	1	5	6	1	5	7	39
	14	8	5	5	4	8	15	8	11	11	89

The number of the Criminal Insane in the Lunatic Department at 31st December 1868, amounted to 34 males and 16 females—50 in all, being the greatest number reported in that Department.

The number of our Criminal Lunatics have been steadily becoming greater, and it is obvious that increased accommodation must be afforded very soon; and if an extension of the building is entered upon, there may be, at the same time, better arrangements made for the comfort and improvement of the inmates.

I have the honour to be, Gentlemen, your most obedient Servant,

J. B. Thomson, *Resident Surgeon.*

To the Managers of the General Prison for Scotland, &c. &c.

XIV.—Return by the Resident Surgeon of the General Prison at Perth, applicable to those Prisoners who have been confined in the Department for Criminal Lunatics during the year 1868.

	M.	F.	TOTAL.
Insane in Custody at 31st December 1867,	31	14	45
Admitted during 1868,	7	4	11
Total during 1868,	38	18	56
Liberated and removed in 1868,	4	2	6
Remaining in Custody at 31st December 1868,	34	16	50

	C/n.	Name.	Age on committal to Prison. M.	Age on committal to Prison. F.	Whence brought.	Brought to Lunatic Department.	Afterwards transferred to Lunatic Department.	Date of Admission to Lunatic Department.	Offence of which Accused or Convicted.	By what Court Tried.	Judgment of Court or other Judicial proceeding, with Date.	Whether admitted on Judicial Finding or Medical Certificate of Lunacy.	Form of Insanity.	Removed during the year. Date.	Removed during the year. Method.	REMARKS.
	316/5	J. J., Jr.	11	...	Royal Lunatic Asylum, Glasgow.	1	...	Dec. 25, 1846	Assault .	Sheriff Court, Lerwick.	Found not to be a fit subject for trial on account of imbecility and dumbness, and sentenced to imprisonment until further orders of the Court, or of the High Court of Justiciary, 5th May 1845.	Judicial Finding.	Idiocy .	.....	.....	*Naturaliter Idiota;* Mischievous, dumb. Offences:—Pushed two children over Lerwick Pier, and assaulted several children, striking them severely; dangerous, suddenly rushes at persons, strikes, and kicks; is filthy.
2	95/6	T. M'K.	37	...	Royal Lunatic Asylum, Dundee.	1	...	May 4, 1847	Murder . .	Circuit Court, Glasgow.	On trial, found to be insane, and not an object of punishment, and sentenced to be detained in Prison all the days of his life, or until sufficient caution be found for his safe keeping in custody during life, 6th May 1839.	Do.	Homicidal Mania.	.....	.....	Had hallucinations; never had lucid intervals; murdered his own sister to save her from imaginary persecutions.
3	111/6	A. R.	30	...	Do.	1	...	... ...	Assault . .	Sheriff Court, Stirling.	Found to be insane and not a fit subject for trial, and sentenced to be detained in Prison, subject to future orders of Court, 26th May 1841.	Do.	Mania.	.....	.....	Has delusions about his being a great personage; has scarcely ever been heard to speak for years.
4	169/6	T. B.	25	...	Dumfries Asylum.	1	...	July 9, ...	Assault with intent to ravish.	Circuit Court of Justiciary, Ayr.	Found to be insane and not a fit subject of trial, and sentenced to be detained in custody until further orders of the High Court of Justiciary, 15th September 1843.	Do.	Do.	.....	.....	Mischievous; suddenly rushes upon persons, strikes and kicks; sometimes low and moody.
5	242/6	M. P.	...	34	Morningside Lunatic Asylum.	1	...	Sept. 23, ...	Wilful fire-raising and malicious mischief.	Circuit Court of Justiciary, Jedburgh.	Found to be unfit for trial from the state of her mind, and to be detained in Prison until further orders of the High Court of Justiciary, 4th April 1842.	Do.	Do.	.....	.....	Quiet and harmless.
6	171/9	J. D.	28	...	Dumbarton Prison.	1	...	June 15, 1850	Assault, with intent to rob	Sheriff Court, Dumbarton.	Found to be insane and not fit for trial, and ordered to be detained in Prison until removed therefrom by competent authority, 7th June 1850.	Do.	Do.	.....	.....	Harmless; filthy.
7	172/9	W. K.	22	...	Perth County Prison.	1	...	... 18, ...	Murder . .	Circuit Court, Perth.	Found not in a fit state to be put on his trial, and the diet deserted *pro loco et tempore,* and grants warrant to commit him to the Prison of Perth, therein to be detained until further orders of the Court of Justiciary regarding him, 26th Sept. 1850.	Do.	Homicidal Mania	.....	.....	*Naturaliter Idiota;* was confined in Lunatic Wing untried from 18th June, until brought before the Circuit Court. Dangerous; makes sudden attacks on persons.
8	310/9	M. R.	27	...	Stirling Prison.	1	...	Nov. 12, ...	Theft by house-breaking and previous conviction.	Circuit Court, Stirling.	Found to be insane and not fit for trial, and to be detained in Prison until further orders of Court, 12th April 1850.	Do.	Mania.	Sept. 24, 1868.	Died.	Quiet and harmless.

Return by the Resident Surgeon, applicable to those Prisoners who have been confined in the Department for Criminal Lunatics—*continued.*

	Name.	Age on committal to Prison. M.	Age on committal to Prison. F.	Whence brought.	Brought to Lunatic Department.	Afterwards transferred to Lunatic Department.	Date of Admission to Lunatic Department.	Offence of which accused or convicted.	By what Court tried.	Judgment of Court or other Judicial proceeding, with Date.	Whether admitted on Judicial Finding or Medical Certificate of Lunacy.	Form of Insanity.	Removed during the year. Date.	Removed during the year. Method.	REMARKS.
10	R. B. or M.	...	30	Edinburgh Prison.	1	...	Mar. 14, 1851	Assault . .	High Court of Justiciary, Edinburgh.	Found to be insane and not a proper object of trial, and ordered to be detained in Prison until further orders of Court, 12th March 1851.	Judicial Finding.	Mania.	....	.....	Subject to fits of passion; very incoherent.
11	I. B.	...	50	Perth County Prison.	1	...	May 14, 1852	Murder .	Circuit Court of Justiciary, Perth.	On trial, found to have been insane at the time of committing the offence, and not an object of punishment, and adjudged to be detained in Prison all her life, or at least until further orders of Court, 29th April 1852.	Do.	Homicidal Mania.	.....	.....	Murdered her mother; is a hypochondriacal and ill-tempered woman.
12	J. D. S.	24	...	Glasgow Prison,	1	...	Mar. 18, 1853	Murder. .	Circuit Court of Justiciary, Glasgow.	Death, but commuted to transportation for life, on account of insanity, 4th January 1853.	Medical Certificate.	Do.	.....	.....	Dangerous, and filthy in his habits.
13	H. M'N.	27	...	Ayr Prison.	1	...	July 22, 1854	Rape. .	Circuit Court, Ayr.	Found to be insane, and not fit for trial, and adjudged to be imprisoned until further orders of the Court of Justiciary, 18th April 1854.	Judicial Finding.	Mania.	.....	.....	Of disgusting habits and conversation.
14	W. G. T.	35	...	Perth County Prison.	1	...	Oct. 13, 1855	Assault to the effusion of blood and serious injury of the person	Circuit Court of Justiciary, Perth.	Found, from the state of his intellect, not a proper object for trial, and to be detained in Prison subject to the future orders of the High Court, 2d October 1855.	Do.	Idiocy.	.....	.....	*Naturaliter Idiota.*
15	M. F. or M'L.	...	28	Glasgow Prison.	1	...	July 15, 1856	Murder .	Circuit Court of Justiciary, Glasgow.	Found to have been insane at the time of committing the act charged, and not a proper object of punishment, and adjudged to be detained in Prison subject to the future orders of the High Court of Justiciary, 2d May 1856.	Do.	Homicidal Mania.	.....	.....	In the puerperal state, and, under a fit of jealousy, destroyed her child.
16	H. S.	27	...	Edinburgh Prison.	1	...	Feb. 19, 1857	Murder .	High Court of Justiciary, Edinburgh.	Found to be insane, and not fit for trial, and ordered to be detained in the General Prison at Perth, subject to future orders of the Court, 16th February 1857.	Do.	Do.	.....	.....	When in the Greenock poorhouse, murdered one of the paupers; dangerous, and attacks persons suddenly.
17	A. M'P.	26	...	Inverness Prison.	1	...	Dec. 21, 1857	Murder .	Circuit Court of Justiciary, Inverness.	Found to be insane at the time he committed the act, and adjudged to be detained in Prison, subject to future orders of the High Court of Justiciary, 30th September 1857.	Do.	Do.	.....	.....	Under delusions; murdered three persons, his father, mother, and aunt, in one night. Has had repeated homicidal impulses.
17	T. A. S. or F. or T. or T.	39	...	Edinburgh Prison.	1	...	Aug. 14, 1858	Murder .	High Court of Justiciary, Edinburgh	Found to be insane and not fit for trial, and ordered to be kept in custody until her Majesty's pleasure be known, 19th July 1858.	Do.	Do.	.....	.....	Has delusions that poison has eaten away his brain and stomach; suicidal.
18	A. M.	23	...	Perth County Prison.	1	...	Feb. 22, 1859	Murder .	High Court of Justiciary.	Found to have been insane at the time of committing the offence, and ordered to be kept in custody until Her Majesty's pleasure be known, 16th Nov. 1858.	Do.	Do.	.....	.....	Certified insane on admission; but has shown no mental disorder or delusion here. On the 30th Jan. 1861 was certified as sane, and, on the authority of the Prison Managers, was transferred to Main Prison on 5th March 1861, and put to prison service. Returned to Lunatic Department proper on the 17th December 1862.
15	C. M'K	...	21	Glasgow Prison.	...	1	Dec. 20, ...	Theft and previous conviction.	Circuit Court, Glasgow.	15 years' transportation, 8th Jan. 1856, .	Medical Certificate.	Mania.	.....	.....	Admitted to Main Prison, March 19, 1856; Imbecile, May 7, 1859; sent to Imbecile Ward at its opening in Aug. 1859. Has delusions that she gets poison and rats in her food. Violent, threatens, and strikes. Formerly in Brixton and Millbank.

				Prison.				Stirling.	Majesty's pleasure, 21st Sept. 1860.	finding.	mania.			She was found insane by a jury. Her delusion was that she and her family were to be burned in the Poorhouse at Stirling, and to avert this fate she threw herself and two of her children into the canal at Falkirk; one of the children was drowned. Reported sane, 3d July 1862. Has again become insane and violent.
69/20	R. A. H.	...	27	Edinburgh Prison.	...	1	May 4, 1861.	Theft and previous conviction.	High Court of Justiciary.	8 years' penal servitude, 4th Feb. 1861.	Medical Certificate.	Mania.	.....	.....	R. A. H. was here formerly a convict under sentence of 4 years' penal servitude; always regarded as of weak mind; re-admitted weak-minded and violent. Insane delusions, soon after re-admission, took possession of her mind, that strange beings visited in her cell and tormented her. She became noisy, turbulent, and incoherent.
189/20	M. M'K. or M'G.	...	28	Perth Prison.	1	...	May 24, ...	Murder.	Circuit Court, Perth.	Verdict—Insane at time of offence. Her Majesty's pleasure, 26th April 1861.	Judicial finding.	Homicidal Mania.	.....	.....	Murdered her own boy, 4 years old, and attempted suicide under religious excitement after attending revival meetings. Reported as sane, 8th July 1862.
217/21	R. P.	35	...	Glasgow Prison.	1	...	June 26, 1862.	Murder.	Circuit Court, Glasgow.	Verdict—Insane at time of offence Her Majesty's pleasure, 26th Sept. 1861.	Do.	Do.	.....	.....	This man was admitted June 26, 1862, and since that time has shown no symptoms of insanity. He murdered his own child under a fit of mania consequent upon habits of intemperance. Certified sane, 18th November 1862.
395/21	H. S., Jun.	30	...	Fort-Charlotte.	1	...	Nov. 19, ...	Assault.	Sheriff Court, Lerwick.	Verdict—Insane at time of offence. Her Majesty's pleasure, 14th Oct. 1862.	Do.	Mania.	.....	.....	This man's certificate bears that he believes in witchcraft, and that he can cure diseases by transferring them to himself. Noisy and troublesome.
17/22	T. D.	40	...	Glasgow Prison.	1	...	Jan. 7, 1863.	Assault with intent to ravish.	Circuit Court, Glasgow.	Verdict—Insane at time of offence. Her Majesty's pleasure, 23d December 1862.	Do.	Epileptic Mania.	.....	.....	On admission reported to have had epilepsy, succeeded by maniacal excitement at different times; also, that he held delusions. Since his admission he has had epileptic attacks, and in January made assaults upon the persons of fellow-prisoners.
229/23	T. A.	55	...	Alloa Prison.	1	...	June 11, 1864.	Murder.	High Court, Edinburgh.	Verdict—Insane at time of offence. Her Majesty's pleasure, 6th June 1864.	Judicial finding.	Homicidal mania.	.....	.....	Murdered a boy under the delusion that he was an emissary of the Free Church sent to injure him. Still holds delusions about his being persecuted by the Free Church.
461/23	A. W. or M'K.	...	24	Inveraray Prison.	1	...	Nov. 26, ...	Assault.	Sheriff-Court, Inveraray.	Verdict—Insane at time of offence. Her Majesty's pleasure, 30th August 1864.	Do.	Mania.	.....	.....	Her medical certificate bears that she is subject to insanity monthly, when she gets nervous and excited.
471/23	J. M'G. or G.	19	...	Greenlaw Prison.	1	...	Dec. 9, ...	Fire-raising.	Sheriff-Court, Greenlaw.	6 months' imprisonment, 27th Oct. 1864. (Detained, on expiry of sentence, by Secretary of State's Warrant, dated 31st March 1865.)	Medical Certificate.	Dementia.	.....	.....	Became insane after conviction, and was removed from Greenlaw Prison on Managers' authority, in terms of 25 and 26 Vict. c. 54, sect. 22; restless, mischievous, and dangerous.
485/23	M. M'L	24	...	General Prison, Penal Department.	...	1	Mar. 3, 1865.	Theft and previous conviction.	High Court of Justiciary, Edinburgh.	7 years' penal servitude, 12th December 1864.	Do.	Mania.	.....	.....	Soon after admission his mind gave way to religious delusions, and, on 14th Jan. 1865, was sent to Imbecile Ward, where he became worse; he has delusions about good and evil spirits visiting him.
272/23	R. W. C. or C.	25	...	General Prison, Penal Department.	...	1	... 10, ...	Theft by housebreaking.	Circuit Court, Perth.	10 years' penal servitude, 5th May 1864.	Do.	Do.	.....	.....	On 10th Feb. 1865, became excited, with delusions, and a suicidal tendency. He has lucid intervals, but relapses, and holds delusions about the devil appearing to him.

Return by Resident Surgeon, applicable to those Prisoners who have been confined in the Department for Criminal Lunatics—*continued.*

n.	Name.	Age on committal to Prison. M.	Age on committal to Prison. F.	Whence brought.	Brought to Lunatic Department.	Afterwards transferred to Lunatic Department.	Date of Admission to Lunatic Department.	Offence of which accused or convicted.	By what Court tried.	Judgment of Court or other Judicial proceeding, with Date.	Whether admitted on Judicial Finding or Medical Certificate of Lunacy.	Form of Insanity.	Removed during the year. Date.	Removed during the year. Method.	REMARKS.
24	A. C.	...	32	General Prison, Penal Department.	...	1	Mar. 15, 1865.	Theft and previous conviction.	High Court of Justiciary.	4 years' penal servitude, 20th June 1864.	Medical Certificate.	Mania.	June 17, 1868.	Removed to Edinburgh Prison for liberation.	On admission from Ayr, reported as subject to fits of mental excitement, with great violence of temper and divers delusions. She has intervals of quiet, but is fully worse than on admission. She was here formerly.
/24	M. C. or B.	...	32	Ayr Prison.	1	...	April 29, ...	Murder.	Circuit Court, Ayr.	Verdict—Insane at time of offence. Her Majesty's pleasure, 19th April 1865.	Judicial finding.	Do.	.....	.....	This woman has been sane since admission—she threw her child into a well, where it was drowned, and afterwards attempted suicide. There is hereditary insanity, which has appeared in several members of the family. Reported sane since admission, 30th August 1865.
3/24	J. M'V.	50	...	Inveraray Prison.	1	...	... ...	Murder.	Circuit Court, Inveraray.	Insanity in bar of trial. Her Majesty's pleasure, 19th April 1865.	Do.	Dementia.	.....	.....	Suddenly, without any warning, lifted a hatchet and killed his son—attempted to strike his wife with the same weapon, and for a time furiously defied all about him. He is in a very demented state.
3/24	A. T.	45	...	Greenlaw Prison.	1	...	May 13, ...	Murder.	Circuit Court, Jedburgh.	Verdict—Insane at time of offence. Her Majesty's pleasure, 4th May 1865.	Do.	Homicidal Mania.	.....	.....	This man has been sane since admission. He killed his wife with an iron poker, tongs, and earthen jug, and went and told what he had done. His madness was consequent upon a long course of excessive drinking. A quiet prisoner.
3/24	G. S.	62	...	Aberdeen Prison.	1	...	June 8, ...	Murder.	Circuit Court, Aberdeen.	Death, but commuted to penal servitude for life, 19th April 1865.	Medical Certificate.	Epileptic Mania.	.....	.....	After a series of misfortunes, had an epileptic seizure, made an assignation with a female friend in a wood, and with an axe murdered her. He was quite calm after the act. He was sent here certified insane.
6/23	J. W.	27	...	General Prison, Penal Department.	...	1	June 30, ...	Assault, with intent to ravish, and previous conviction of assault.	Circuit Court, Jedburgh.	18 months' imprisonment, 19th April 1864 (Detained, on expiry of sentence, by Secretary of State's Warrant, dated 11th October 1865.)	Do.	Mania.	.....	.....	Was here formerly. He has various delusions that he is untried, has got a free pardon, and discovered a way to pay the national debt off; detained after expiry of sentence on the ground of being twice committed for assault with intent to ravish, in terms of 25 and 26 Vict. c. 54, sect. 22.
/24	J. H.	27	...	Edinburgh Prison.	1	...	Dec. 4, ...	Murder.	High Court, Edinburgh.	Insanity in bar of trial. Her Majesty's pleasure, 27th November 1865.	Judicial finding.	Dementia.	.....	.....	With an iron bar which he had concealed he killed his mother and sister. A dangerous man.
7	J. R.	21	...	Aberdeen Prison.	1	...	May 21, 1866.	Theft.	Sheriff Court, Aberdeen.	Insanity in bar of trial. Her Majesty's pleasure, 8th November 1865.	Do.	Dementia.	.....	.....	Very imbecile, and not improved in mind; seems to have been congenitally weak.
2	P. W.	25	...	General Prison, Penal Departmt.	...	1	Dec. 29, ...	Assault by cutting and stabbing to great effusion of blood, etc.	Sheriff Court, Linlithgow.	12 months' imprisonment 4 months' hard labour (Detained, on expiry of sentence, by Secretary of State's Warrant, dated 8th April 1867.)	Do.	Do.	.....	.....	Probably weak in mind congenitally; has delusions chiefly about his food; dangerous. Detained by Secretary of State's Warrant, in terms of 25 and 26 Vict. c. 54, sect. 22.
0	J. K.	19	...	Prison of Perth.	1	...	April 20, ...	Murder.	Circuit Court, Perth.	Insanity in bar of trial. Her Majesty's pleasure, 8th April 1867.	Do.	Epileptic Mania.	.....	.....	In a quarrel in the Fife and Kinross Asylum, this prisoner killed a fellow patient. He is subject to severe epileptic attacks; is quarrelsome, dangerous, and filthy.
6	J. M'D.	20	...	Prison of Glasgow.	...	1	... 16, ...	Assault, with intent to ravish.	Circuit Court, Glasgow.	12 months' imprisonment, 26th Dec. 1866. (Detained, on expiry of sentence, by Secretary of State's Warrant, of date 29th Oct. 1867.)	Do.	Dementia.	.....	.....	Ordered to be detained after expiry of sentence, in terms of 25 and 26 Vict. c. 54, sect. 22, his offence being assault, with intent to ravish. He never speaks, and refuses to take food, having to be fed by force.

41/23	C. B. or J.	...	48	Glasgow Prison.	...	1	April 31, 1867.	Theft, habit and repute, and previous conviction.	Circuit Court, Aberdeen.	6 years' penal servitude, 24th Sept. 1863.	Judicial finding.	Dementia.	.....	.....	For some time back has had symptoms of softening of brain and general paralysis, gradually sinking.
95/26	C. C.	...	30	Do.	1	...	Oct. 7, ...	Theft and previous conviction.	Circuit Court, Glasgow.	Insanity in bar of trial, 1st October 1867.	Judicial finding.	Mania.	.....	.....	Here for the third time, always violent and weak-minded, and latterly insane. Has been in an Asylum elsewhere; was twice here under conviction sentences.
10/26	M. H. or B.	...	26	Paisley Prison.	1	...	... 14, ...	Murder.	Do.	Verdict—Insane at time of offence, 2d October 1867.	Do.	Puerperal Mania.	.....	.....	Murdered her child; was insane in April; improved, but relapsed in May; is weak-minded, and irritable at all times.
66/26	A. B.	29	...	Dundee Prison.	1	...	Dec. 6, ...	Do.	High Court, Edinburgh.	Verdict—Insane at time of offence, 2d December 1867.	Do.	Mania.	.....	.....	Had been in Dundee Asylum, and soon after he was liberated, with an axe or hatchet killed his sister. Insane at present.
2/27	E. G. or B.	...	21	Glasgow Prison.	1	...	Jan. 2, 1868.	Murder.	Circuit Court, Glasgow.	Found on trial to be insane. Her Majesty's pleasure, 26th December 1867.	Do.	Puerperal Mania.	.....	.....	Reported insane on admission. Violent periodically, and suicidal.
96/27	W. B.	38	...	Fife and Kinross Asylum.	1	...	Mar. 4, ...	Assault upon a child.	Sheriff Court, Dunfermline.	Found on trial to be insane. Ordered by Secretary of State to be detained in General Prison.	Do.	Mania.	.....	.....	Tried 15th August 1861; removed to Asylum, thence to General Prison by order dated 27th February 1868.
03/27	A. M.	20	...	Aberdeen Prison.	1	...	May 1, ...	Attempting murder by fire-arms, etc. etc.	Circuit Court, Aberdeen.	Insanity in bar of trial. Her Majesty's pleasure, 17th April 1868.	Do.	Homicidal Mania.	19th Nov. 1868.	Died.	
52/24	A. C. or T.	...	44	General Prison, Penal Department.	...	1	July 1, ...	Theft and previous conviction.	Circuit Court, Perth.	7 years' penal servitude, 28th Sept. 1864.	Medical Certificate.	Acute Mania.	26th Oct. 1868.	Recovered, and sent back to Main Prison.	Has been frequently insane.
18/27	K. C.	40	...	Edinburgh Prison.	1	...	... 30, ...	Murder.	High Court, Edinburgh.	Verdict—Insane at time of offence. Her Majesty's pleasure, 20th July 1868.	Judicial finding.	Homicidal Mania.	.....	.....	A dangerous man; homicidal, with religious mania, at times suddenly recurring.
20/27	D. W.	17	...	General Prison, Penal Department.	...	1	Sept. 12, ...	Theft and previous conviction.	Sheriff-Court, Edinburgh.	9 months' imprisonment, 16th December 1867.	Medical Certificate.	Mania.	16th Sept. 1868.	Handed over to Inspector of Poor, Perth.	Suspicious of food; afraid of evil spirits.
48/27	H. M'C.	35	...	Do.	...	1	... 15, ...	Theft and previous conviction.	Sheriff-Court, Hamilton.	9 months' imprisonment, 27th December 1867.	Do.	Dementia.	25th Sept. 1868.	Sent to Hamilton Prison by Managers' order.	Has general paralysis, with delusions that he is wealthy; filthy in habits.
27/27	J. H.	40	...	Glasgow Prison.	1	...	Oct. 8, ...	Assault by cutting and stabbing, etc.	Circuit Court, Glasgow.	Insanity in bar of trial. Her Majesty's pleasure, 21st September 1868.	Judicial finding.	Do.	.....	.....	Stabbed his wife in a passion.
93/27	M. S. or L.	...	30	Jedburgh Prison.	1	...	... 20, ...	Murder.	Circuit Court, Jedburgh.	Insanity in bar of trial. Her Majesty's pleasure, 18th Sept. 1868.	Do.	Puerperal Mania.	.....	. ....	Is subject to melancholy; murdered her child while nursing it.
91/27	W. C.	30	...	Dundee Prison.	1	...	Dec. 12, ...	Murder.	High Court, Edinburgh.	Insane at time of offence. Her Majesty's pleasure, 7th December 1868.	Do.	.....	.....	.....	Has religious delusions, with fits of excitement, singing, crying, etc.
48/27	J. M.	...	25	General Prison, Penal Department.	...	1	... 31, ...	Theft and previous conviction.	Sheriff-Court, Aberdeen.	9 months' imprisonment, 14th November 1868.	Medical Certificate.	Mania.	... ..	.....	Suddenly became furious, epileptic, and insane.

General Prison, Perth, 21st January 1869.

J. B. THOMSON, *Resident Surgeon.*

XV.—Report by the Governor and Resident Surgeon of the General Prison at Perth, of the deaths of Prisoners in the General Prison, from 1st January to 31st December 1868, inclusive.

ent ber. F.	Name.	Age at Commitment to Prison.	Where Tried.	By whom Tried.	Date of Sentence.	Sentence.	Date of Admission into the General Prison.	Date of Death.	Period in Prison. Months.	Days.	Where Interred.	Disease.	Whether Contracted before or after Admission.	Probable Cause of Disease.	Remarks.
	F. M'C.	24	Edinburgh	Sheriff Court.	Feb. 25, 1867.	12 months.	April 6, 1867.	Jan. 11, 1868.	9	5	Precincts of Prison.	Perineal abcess.	After.	Unknown.	
	C. T.	40	Glasgow.	Circuit Court.	Oct. 7, 1867.	20 years.	Nov. 25, 1867.	April 1, 1868.	4	7	Do.	Liver disease.	Do.	Do.	Sunk rapidly after admission.
	D. W.	48	Edinburgh	Sheriff Court.	Sept. 20, 1867.	15 months.	Nov. 5, 1867.	May 8, 1868.	6	3	Wellshill Cemetery.	Abscess of Liver, etc.	Before.	Dissipation.	Has been long worn out.
239/24	M. M.	19	Glasgow.	Circuit Court.	Oct. 1, 1863.	21 years' P. S.	May 27, 1865.	July 24, 1868.	37	27	Precincts of Prison.	Phthisis.	Do.	Hereditary.	Several members of the family died of phthisis.
18/25	M. L. or H.	64	Do.	Do.	April 21, 1864.	6 years' P. S.	Jan. 2, 1866.	Sept. 2, 1868.	32	0	Do.	Paralysis.	Do.	Brain disease.	On admission paralysed, and sent to hospital.
	A. J.	18	Do.	Sheriff Court.	Mar. 4, 1868.	10 months.	May 11, 1868.	Sept. 18, 1868.	4	7	Do.	Phthisis.	Do.	Unknown.	On admission, phthisical.
	M. R.	27	Stirling.	Circuit Court.	April 12, 1850.	Lunacy in bar of trial; imprisonment until further orders of Court.	Nov. 12, 1850.	Sept. 24, 1868.	214	12	Do.	General decay and dropsy.	After.	Heart disease.	Insane since admission.
	J. B.	25	Glasgow.	Do.	Oct. 2, 1867.	15 months.	Nov. 16, 1867.	Sept. 29, 1868.	10	13	Do.	Bronchitis, etc.	Before.	...	On admission sent to hospital as an invalid.
390/26	M. C. or M'R.	39	Ayr.	Sheriff Court.	Sept. 16, 1867.	18 months.	Sept. 30, 1867.	Oct. 22, 1868.	12	22	Do.	Menorrhagia.	After.	Dissipation.	A frequent prisoner; worn-out.
	J. C.	60	Aberdeen.	Circuit Court.	April 17, 1868.	18 months.	July 25, 1868	Nov. 11, 1868.	3	17	Do.	Hydrothorax.	Do.	Old bronchial disease.	Not strong since admission.
	A. M.	20	Do.	Do.	April 17, 1868.	Lunacy in bar of trial. H. M. pleasure.	May 1, 1868.	Nov. 19, 1868.	6	18	Wellshill Cemetery.	Scalding by hot water.	Do.	...	An insane prisoner.

I certify that the dates of death, the diseases, whether contracted before or after admission, probable causes of disease of the above-named Prisoners, and the relative remarks, are correct, the columns having been filled up under my direction.

J. B. Thomson, *Resident Surgeon.*

I certify that the current numbers, names, ages, where tried, by whom tried, dates of sentence, sentences, dates of admission, period in prison, and where interred, are correct; and also that means were used to acquaint the relatives of the above-named Prisoners, in order that they might have an opportunity of removing the bodies for interment, if they wished so to do.

Fred. S. Parkyn, *Governor.*

General Prison for Scotland, Perth, 21st January 1869.

No. XVI.—Return for the Year 1868, of Prisoners put, by the authority of the Resident Surgeon, in Association, as better suited to their Mental Condition than Separation, with the reasons for Associating in each case.

Current Number.	Name.	Age when committed to Prison. M.	Age when committed to Prison. F.	Prison whence Received.	Date of Sentence.	Duration of Sentence.	Date of Admission.	Date of putting on Treatment.	Condition.	Probable Cause of Condition.	Whether before or after Admission.	At the end of the Year. Not in Prison.		At the end of the Year. In Prison. In Association.	At the end of the Year. In Prison. In Separation.	At the end of the Year. In Prison. In Lunatic Department.	No.	Remarks.
18/25	M. L. or H.		64	Ayr.	April 2, 1865.	6 yrs.	Jan. 2, 1866.	Jan. 2/66.	Imbecile.	Paralysis.	Before.	Died.	Sept. 2,				1	Had brain disease.
406/25	T. H.	24		Edinburgh.	Sept. 18, 1866.	18 ms.	Sept. 22, ...	Sept. 22, ...	Do.	Was insane.	Do.	Liberated,	Mar. 18,				2	Here twice formerly—had been in an Asylum.
521/25	E. M'G. or T.		30	Perth.	... 27, 1864.	5 yrs.	Oct. 24, ...	Nov. 28, ...	Epileptic.	Congenital.	Do.	Do.,	Feb. 17,				3	On admission, her fits, supposed to be hysterical, found to be epileptic.
564/25	J. T.	40		Glasgow.	Nov. 27, 1866.	18 ms.	Nov. 30, ...	Jan. 1/67.	Imbecile.	Do.	Do.	Do.,	May 7,				4	On admission imbecile.
304/25	C. C. or W.		25	Do.	May 1, 1866.	10 yrs.	July 10, ...	Apl. 3, ...	Do.	Do.	Do.			1			5	Here formerly—weak-minded—getting worse.
452/24	A. C. or T.		44	Perth.	Sept. 28, 1864.	7 ...	Oct. 31, 1865.	May 4, ...	Was insane and still imbecile.		Do.			1			6	Has been frequently insane, and is recovered at present.
317/24	M. B.		26	Glasgow.	May 2, 1865.	8 ...	July 11, ...	... 6, ...	Imbecile.	Congenital.	Do.				1		7	Here formerly—excitable—noisy—filthy.
181/26	A. G.		21	Inverness.	April 15, 1867.	9 ms.	May 7, 1867.	... 7, ..		Has no English, a Highlander.	Do.	Liberated,	July 15,				8	Highlanders, having no English, often suffer mentally unless associated.
252/26	J. M'A.		26	Glasgow.	June 7, ...	...	June 25, ...	June 25, ...	Do.	Congenital.	Do.	Do.,	Mar. 7,				9	Imbecile—*naturaliter*.
266/26	A. M'J.	19		Edinburgh.	... 3, ...	8 yrs.	July 3, ...	July 3, ...	Do.	Was insane.	Do.	Sent to Portsmouth	Apl. 27,				10	Here formerly—insane and recovered, but unfit for separation.
346/26	D. M.	18		Paisley.	... 10, ...	18 ms.	Aug. 17, ...	Aug. 17, ...	Epileptic.	Congenital.	Do.	Liberated,	Dec. 10,				11	On admission epileptic.
386/26	A. B.	35		Glasgow.	Sept. 6, ...	12 ...	Sept. 27, ...	Sept. 27, ...	Do.	Do.	Do.	Do.,	Sept. 7,				12	Do. do.
16/26	W. S.	15		Do.	Dec. 26, 1866.	18 ...	Jan. 9, ...	Nov. 5, ...	Imbecile.	Do.	Do.	Do.,	June 26,				13	Had delusions.
347/26	J. M'F.	22		Dunfermline.	June 29, 1867.	12 ...	Aug. 20, ...	Dec. 9, ...	Do.	Do.	Do.	Do.,	... 24,				14	Had delusions on various subjects.
476/26	J. B.		35	Edinburgh.	Sept. 30, ...	15 ...	Nov. 5, ...	Jan. 1/68.	Do.	Was insane.	Do.	Do.,	Dec. 30,				15	Here three times.
420/20	M. B. or D.		35	Perth.	April 11, 1865.	10 yrs.	Oct. 21, ...	... 3, ...	Epileptic.	Congenital.	Do.						16	Here formerly—a convict.
30/26	M. P.		40	Aberdeen.	Jan. 8, 1868.	9 ms.	Jan. 2, 1868.	... 24, ...	Do.	Do.	Do.	Do.,	Oct. 8,				17	Do. do.
252/24	P. M.		53	Edinburgh.	Nov. 16, 1863.	8 yrs.	May 27, 1865.	... 30, ...	Imbecile.	?	Do.			1			18	Here formerly—malingering.
130/27	M. M'J.		20	Ayr.	Dec. 26, 1865.	5 ...	Mar. 20, 1868.	Mar. 21, ...	Imbecile and Suicidal.		Do.				1		19	Threw herself over a gallery in Ayr Prison.
121/27	M. P. or D.		62	Do.	Oct. 5, ...	12 ...	... ...	... 20, ...	Imbecile.	Age.	Do.				1		20	Here formerly.
48/27	H. M'C.	35		Hamilton.	Dec. 27, 1867.	9 ms.	Jan. 31, ...	Apl. 28, ...	Do.	Congenital.	Do.	Do.,	Sept. 25,				21	Sent back to Hamilton Prison insane.
200/27	J. M'A.		26	Glasgow.	April 21, 1868.	12 ...	April 29, ...	... 29, ...	Do.	Do.	Do.				1		22	Separated for bad conduct in association.
34/26	P. H.	18		Do.	May 28, 1867.	18 ms.	July 31, 1867.	June 15, ...	Do.	Do.	Do.	Do.,	Nov. 28,				23	Here formerly—weak in body and mind.
252/27	M. O'B.		22	Do.	April 20, 1868.	7 yrs.	June 19, 1868.	... 19, ...	Do.	?	Do.				1	July 2.	24	Here formerly—with delusions.
314/27	P. M'M.	38		Edinburgh.	... 22, ...	10 ms.	July 25, ...	July 25, ...	Blind.		Do.			1			25	Totally blind.
31/24	M. G. or L.		28	Glasgow.	Dec. 28, 1864.	7 yrs.	Jan. 11, 1865.	Aug. 17, ...	Weak-minded.	Congenital.	Do.			1			26	Suspicious of Officers—has delusions.
370/27	J. L.	18		Do.	May 23, 1868.	12 ms.	Aug. 29, 1868.	.. 29, ...	Epileptic.	Do.	Do.			1			27	On admission epileptic.
219/27	J. W.	19		Edinburgh.	Mar. 10, ...	18 ...	May 13, ...	Oct. 6, ...	Imbecile.	Do.	Do.			1			28	Here formerly—weak-minded.
122/26	W. M'C.	21		Glasgow.	Feb. 6, 1867.	24 ...	April 5, 1867.	... ...	Do.	Do.	Do.			1			29	Do. do.
548/27	J. M.		25	Aberdeen.	Nov. 14, 1868.	9 ...	Nov. 23, 1868.	Dec. 23, ...	Excited.	Epileptic.	Do.					1 Dec. 31.	30	Suddenly became excited and epileptic—at length insane.

General Prison, Perth, 21st January 1869.

J. B. THOMSON, *Resident Surgeon.*

No. XVII.—Particulars relating to 30 Convicts (Sentenced before the commencement of the Mark System), released on Orders of License by the Secretary of State, from the General Prison for Scotland at Perth, during the Year ended 31st December 1868.

No.	C/n.	Initials.	Offence.	Date of Sentence.	Sentence.	Recorded Number of Prison Offences.	Recorded Weekly Conduct.						Longest period remissible in Secretary of State's Scale.	Time deducted from longest period.	Date of Liberation.	How Disposed of.
							Very Good.	Good.	Indifferent.	Bad.	Very Bad.	Total Number of Weeks.				
1	214/20	A. E.	Assault and Robbery.	Oct. 2, 1860.	10 years' penal serv.	None.	...	333	2	2	...	337	2 yrs. and 9 mths.	None.	Jan. 3, 1868.	Emigrated to Australia, under the auspices of the Prisoners' Aid Society.
2	216/20	J. B.	Child Murder.	... 2, ...	Ditto.	Do.	25	312	...	...	...	337	Ditto.	Do.	... 3, ...	Returned to her mother at Wigtown.
3	13/25	M. H.	Theft.	Mar. 14, 1864.	5 years' penal serv.	Do.	6	186	1	...	...	193	1 year.	Do.	Mar. 14, ...	Returned to Edinburgh, with the view of getting employment there.
4	283/21	B. R. or M'C.	Theft and prev. con.	... 17, 1862.	8 years' penal serv.	Do.	...	282	...	...	...	282	2 years.	Do.	... 17, ...	Returned to her husband in Edinburgh.
5	248/24	H. C. or P.	Ditto.	Sept. 19, 1863.	6 years' penal serv.	Do.	39	179	...	...	...	218	1½ years.	Do.	... 19, ...	Returned to Dundee to seek work.
6	442/23	M. P. or M'G.	Robbery.	... 28, ...	Ditto.	Do.	151	67	...	...	...	218	Ditto.	Do.	... 28, ...	Returned to Glasgow to seek work as a sewer.
7	237/24	H. W. or F.	Theft and prev. con.	... 29, ...	Ditto.	Three	36	181	...	...	1	218	Ditto.	Do.	... 30, ...	Returned to Greenock, with the view of getting work as a laundress.
8	280/21	I. F.	Ditto.	April 18, 1862.	8 years' penal serv.	None.	...	286	1	...	...	287	2 years.	Do.	April 18, ...	Went to Dundee, with the view of getting work.
9	281/21	M. M'C. or C.	Theft by housebreaking, and prev. con.	... 18, ...	Ditto.	Do.	184	103	...	...	...	287	Ditto.	Do.	... 18, ...	Went to a sister near Arrochar.
10	108/25	E. S. or P.	Theft and prev. con.	April 21, 1864.	5 years' penal serv.	Do.	12	174	1	...	...	187	1 year.	Do.	... 21, ...	Returned to her husband near Aberdeen.
11	267/18	J. H. or M'F.	Ditto.	... 27, 1859.	12 years' penal serv.	Do.	54	367	4	...	...	425	3 years.	Do.	... 27, ...	Engaged as a servant by a party in Perth.
12	447/23	B. H. or P.	Ditto.	May 3, 1864.	5 years' penal serv.	Do.	13	179	1	...	...	193	1 year.	Do.	May 4, ...	Went to Arbroath, with the view of getting work.
13	322/25	M. R. or M'E.	Ditto.	... 3, ...	Ditto.	Do.	11	162	...	...	...	173	Ditto.	Do.	... 4, ...	Returned to her husband in Dundee.
14	14/25	C. D. or I.	Ditto.	Nov. 16, 1863.	6 years' penal serv.	Do.	12	211	...	...	...	223	1½ years.	Do.	... 16, ...	Returned to Edinburgh to earn a livelihood as a hawker.
15	319/25	H. M'C.	Ditto.	May 3, 1864.	5 years' penal serv.	One.	30	163	3	...	...	196	1 year.	1 month.	June 5, ...	Returned to Dundee, with the view of getting work in a mill.
16	286/21	A. S. or J.	Ditto.	... 19, 1862.	8 years' penal serv.	One.	38	256	1	1	...	296	2 years.	Do.	... 19, ...	Returned to her husband in Edinburgh.
17	15/25	M. M'L.	Ditto	Dec. 21, 1863.	6 years' penal serv.	Three.	7	204	6	1	1	219	18 months.	3 weeks.	July 13, ...	Returned to her sister in Glasgow.
18	16/25	M. K. or M.	Theft, habit and repute, and prev. con.	Jan. 18, 1864.	Ditto.	One.	10	207	...	1	...	218	Ditto.	None.	... 18, ...	Went to her sister in Greenock, who was to assist her to emigrate to New Zealand.
19	276/23	M. J.	Culpable Homicide.	Sept. 27, 1856.	Transportation for life.	Two.	21	374	16	4	...	415	Considered on its merits after ten years.	2 years.	Sept. 3, ...	Went to Dundee, with the view of getting work in the mills.
20	407/21	M. A. S.	Theft and prev. con.	... 29, 1862.	8 years' penal serv.	None.	6	289	...	...	...	295	2 years.	None.	... 29, ...	Went to Dundee with the view of getting work in the mills.
21	17/25	M. P. or T. or H.	Ditto.	April 19, 1864.	6 years' penal serv.	Do.	1	213	...	...	...	214	1½ years.	Do.	Oct. 19, ...	Went to Stirling, expecting to get employment as a sick-nurse.
22	313/25	J. S. or G.	Ditto.	... 22, ...	Ditto.	Do.	62	163	...	...	...	222	Ditto.	Do.	... 22, ...	Went to her daughter in Dundee, who promised to aid her in getting work.
23	320/25	M. S. or D.	Ditto.	May 3, 1864.	Ditto.	Do.	28	184	...	...	...	212	Ditto.	Do.	Nov. 3, ...	Returned to Dundee, with the view of getting work as a knitter.
24	412/15	M. W.	Murder.	Nov. 8, 1856.	Death, commuted to transportation for life.	Do.	224	200	...	...	...	424	Considered on its merits after ten years, and license now granted on condition that her friends find her work elsewhere than in the neighbourhood where her crime was committed.	2 years.	... 20, ...	Went to a home provided for her in Perth, until she can find some permanent employment.
25	446/23	E. S.	Assault and Robbery.	April 21, 1864.	6 years' penal serv.	Three.	...	217	6	2	1	226	1½ years.	1 month.	... 21, ...	Went to Lanark, with the view of afterwards proceeding to relations in America.
26	277/23	I. M. or M'D.	Theft and prev. con.	Oct. 2, 1861.	8 years' penal serv.	Three.	34	316	6	...	1	357	2 years.	2 months; but licence refused in 1867 on the general rule "that a convict under a previous sentence of transportation should be required to serve out the whole of the first sentence before being considered to release under a second one." *N.B.* Previous sentence completed on 26th Sept. 1868.	... 26, ...	Returned to her father in Glasgow.

PARTICULARS relating to 30 CONVICTS released on Orders of License by the SECRETARY of STATE,—*Continued.*

No.	C/n.	Initials.	Offence.	Date of Sentence.	Sentence.	Recorded Number of Prison Offences.	Recorded Weekly Conduct.					Longest period remissible in Secretary of State's Scale.	Time deducted from longest period.	Date of Liberation.	How Disposed of.
							Very Good.	Good	Indifferent.	Bad.	Very Bad.	Total Number of Weeks.			
27	356/21	C. M'K.	Theft and prev. con.	Sep. 15, 1862.	8 years' penal serv.	Four.	...	306	4	4	1	315	2 years.	3 months.	Dec. 15, 1868.	Returned to an aunt in Glasgow.
28	269/23	C. R.	Theft by housebreaking, habit and repute, and prev. con.	May 5, 1864.	6 years' penal serv.	Six.	...	208	7	7	1	223	1½ years.	6 weeks.	... 17, ...	Returned to her father in Glasgow with the view of emigrating to America.
29	109/25	M. M'D. or R.	Theft, habit and repute, and prev. con.	April 21, 1864.	Ditto.	Three.	11	207	2	2	...	222	1½ years.	2 months.	... 21, ...	Went to Lochee with the view of getting work in a mill.
30	37/22	I. G.	Theft and prev. con.	Dec. 22, 1862.	8 years' penal serv.	None.	14	285	...	...	...	299	2 years.	None.	... 22, ...	Returned to Airdrie to seek work as a laundress.

PARTICULARS relating to 1 CONVICT released on Order of License by the SECRETARY of STATE, from the PRISON OF AYR, during the **Year ended 31st December 1868.**

1	65/25	H. M'L. or A.	Theft.	Sept. 12, 1865.	8 years' penal serv.	None.	In Hospital for sick since 21st Sept. 1867.	.....	....	Feb. 6, 1868.	License granted in consequence of the severe illness of the convict, who was escorted to Dundee, and left under the care of her sister.

No. XVII.—*continued*—PARTICULARS relating to 17 CONVICTS ON THE MARK SYSTEM released on Orders of License by the SECRETARY OF STATE, from the GENERAL PRISON FOR SCOTLAND AT PERTH, during the **Year ended 31st December 1868.**

No.	C/n.	Initials.	Offence.	Date of Sentence.	Sentence.	Record of Marks.					How Disposed of.
						1 No. at 6 per diem to gain full period.	2 Marks forfeited for misconduct.	3 No. 1 with additions of marks forfeited for misconduct.	4 Commencement of full period.	5 Date of liberation on gaining total of marks in No. 3.	
1	508/25	A. S. or S.	Theft and prev. con.	Sept. 15, 1864.	5 Years.	7304	...	7304	Jan. 16, 1868.	Jan. 17, 1868.	Returned to Forres, with the view of obtaining work as a seamstress.
2	511/25	J. N. or P.	Ditto.	... 19, ...	5 ...	7304	...	7304	... 20, ...	... 20, ...	Returned to her daughter at Cambuslang.
3	419/23	F. C.	Theft by housebreaking and prev. con.	... 20, ...	5 ...	7304	...	7304	... 21, ...	... 21, ...	Went to Glasgow to resume hawking fruit.
4	420/23	A. S. or W.	Theft and prev. con.	... 19, ...	5 ...	7304	...	7304	... 20, ...	... 21, ...	Returned to Glasgow to seek employment as a mill-worker.
5	418/23	M. A. D. or C.	Theft, habit and repute, and prev. con.	... 20, ...	5 ...	7304	...	7304	... 21, ...	... 21, ...	Returned to Glasgow to seek employment as a hawker.
6	512/25	J. S.	Theft and prev. con.	... 19, ...	5 ...	7304	...	7304	... 20, ...	... 21, ...	Returned to Glasgow to seek employment as a servant.
7	517/25	E. M'D.	Theft by housebreaking.	... 20, ...	5 ...	7304	...	7304	... 21, ...	... 23, ...	Went to a Refuge in Edinburgh.
8	520/25	I. S. or B.	Theft and prev. con.	... 21, ...	5 ...	7304	...	7304	... 22, ...	... 23, ...	Went to Glasgow to seek employment as a Charwoman.
9	111/25	C. M.	Theft, habit and repute, and prev. con.	... 28, ...	5 ...	7304	...	7304	... 29, ...	... 30, ...	Went to Dundee with the view of etting employment in a mill.
10	513/25	A. S.	Theft and prev. con.	... 19, ...	5 ...	7304	84	7388	... 20, ...	Feb. 7, ...	Went to a cousin in Greenock, who promised to assist her in finding work.
11	224/26	A. T.	Ditto.	... 28, ...	5 ...	7304	...	7304	... 29, ...	... 14, ...	Returned to a sister in Dundee, who promised to aid her in getting work.
12	521/25	E. M'G. or T.	Ditto.	... 27, ...	5 ...	7304	112	7416	... 28, ...	... 17, ...	Returned to her mother in Edinburgh
13	418/26	M. M.	Forgery and uttering.	April 6, 1865.	5 ...	7304	...	7304	Aug. 6, ...	Aug. 7, ...	Went to a Refuge in Edinburgh.
14	533/26	H. F.	Robbery.	May 3, ...	5 ...	7304	...	7304	Sept. 2, ...	Sept. 3, ...	Returned to Greenock, with the view of getting out-door work.
15	534/26	A. M'G. or S.	Ditto.	... 3, ...	5 ...	7304	...	7304	... 2, ...	... 3, ...	Went to her brother in Paisley, who is to aid her to emigrate to America.
16	509/25	J. M'F. or M.	Theft by sheep-stealing.	Sep. 16, 1864.	6 ...	8764	...	8764	... 16, ...	... 18, ...	Returned to Nairn with the view of getting out-door work.
17	532/26	S. B.	Theft, as also forgery and uttering.	May 3, 1865.	5 ...	7304	...	7304	... 2, ...	Nov. 4, ...	Returned to Glasgow to seek a situation as a domestic servant.

No. XVIII.—Documents relating to Female Convicts in the Prison of Ayr (communicated by the Prison Board of Ayrshire).

1. Report by the Governor of the Prison of Ayr for the Year 1868.

Prison of Ayr, 9th January 1869.

Premising that I speak from personal observation of only the last six months of the year, I having commenced duty as Governor of this Prison on the 1st July 1868, I have the honour to report as follows:—

The Rules and Regulations for the General Prison at Perth, in so far as they are applicable to this Prison, have been in force here.

The conduct of the Convicts has been very good; they have, with a very few exceptions, behaved quietly, and been respectful and obedient to the officers over them. The number of prisoners punished has decreased from 18 in 1866, and 13 in 1867, to 7 in 1868. No serious case of misconduct occurred during the year.

The Mark System continues to work well. It is beneficial to both the prisoner and the Prison. It promotes good behaviour among the prisoners, and encourages them in habits of industry, and every year since its introduction there has been a steady decrease in the number of punishments, and the profits from work have year by year been increasing. Notwithstanding the greatly increased amount of work done by Prisoners, complaints by them of overtasking are becoming more and more rare.

James Taylor, *Governor.*

2.—Return relative to Female Convicts in the Prison of Ayr, for the year ended 31st Dec. 1868.

I. Accommodation:—

Number of Cells,	96

II. Convicts:—

In custody at commencement of year,		85
Admitted during the year,—		
From Local Prisons in Scotland,		45
	Total,	130
Removed, viz.—		
To the General Prison at Perth,	45	
Liberated on License,	1	
	—	46
In custody at the end of the year,		84
Daily average throughout the year,		85

III. Punishments:—

Number of Cases of Punishment,	13
Number of Prisoners who have been punished,	7
Number of Prisoners who have *not* been punished,	123

IV. Comparative View of the State as to Education of the Convicts remaining in Custody at 31st December 1868:—

	Reading.			Writing.			Arithmetic.
	Could not Read.	Could Read a little.	Could Read well.	Could not Write.	Could Write a little.	Could Write well.	Had a knowledge of Arithmetic.
On Admission,	10	13	61	21	23	40	18
Total,	84			84			
At 31st December 1868,	3	9	72	9	21	54	24
Total No. in Custody,	84			84			

(No. XVIII. *Continued.*)

V. Ages and Sentences of Convicts in Custody at 31st December 1868 :—

SENTENCES.	AGES.						
	21 Years and above 16.	30 Years and above 21.	40 Years and above 30.	50 Years and above 40.	60 Years and above 50.	Above 60 Years.	Total.
5 Years, ...	3	2	1	...	...	...	6
7 Years, ...	1	23	19	9	8	1	61
8 Years, ...	...	5	1	2	2	...	10
10 Years, ...	...	4	...	2	...	...	6
20 Years, ...	...	1	...	...	...	...	1
Total, . .	4	35	21	13	10	1	84

VI. Sickness of Convicts :—

On Register at the commencement of Year.	Number put on Register during the Year.	Total	Number Removed from Register.	Number on Register at 31st December 1868.
2	7	9	6	3

Of these there were—

Slightly ill, ...	3	Contracted before Admission, . . .	5
Seriously ill, ...	6	Contracted after Admission, . . .	4

Prison of Ayr, 9th January 1869.

James Taylor, *Governor.*

I certify as to the correctness of Table No. VI. of this Return.

Robert Dobbie, M.D., L.R.C.S.E.

3.—Report by the Surgeon of the Prison at Ayr, for the Year 1868.

9th January 1869.

I have nothing special to notice as having occurred during the year now closed, it having been a very healthy one. Nine cases of disease have been put upon the Register, two of which were continued from the former year, and seven were added during the year. At the end of the year three remained, six having recovered or been removed.

In February, a Convict, the subject of cancerous disease, was liberated on license after application to the Secretary of State. In last year's Report the application for a special license to liberate in this instance was mentioned as being then undecided. It may not be out of place to mention here that the woman has since died.

The other cases require no particular notice.

In the hot weather of August there were a few cases of diarrhœa, but they were all of a mild description, requiring very little treatment, and scarcely laying the subjects of them aside from their ordinary duties.

In addition to the above, five Convicts have been associated on account of their mental or physical condition; one on account of nervous excitability, two from having manifested a suicidal tendency, and two epileptics. Two of those have been removed, and there remain one mentioned as suicidal, but who has never attempted injury to herself here, and two epileptics, whose condition varies considerably from the fact that the element of hysteria is largely mixed up with them.

No death has occurred during the year.

The dietary, clothing, heating, and ventilation have been sufficient and satisfactory.

4.—Return by the Surgeon of Ayr Prison of Prisoners put in Association as better suited to their Mental Condition than Separation, dured the Year ending 31st December 1868.

No.	C/n.	Name.	Age when committed to Prison.	Prison whence received.	Date of Sentence.	Duration of Sentence.	Date of Admission.	Date of putting on Treatment.	Condition.	Probable Cause of Condition.	Whether before or after Admission.	Remarks.
1	66/54	Elizabeth Moore or Falconer,.....	29	Dundee.	11th Sept. 1866.	7 years.	29th Oct. 1866.	15th May 1867.	Nervous.	Bad health.	Before.	Very excitable and timid when alone. Removed to General Prison, Perth, on 21st October 1868.
2	66/21	Mary M'Innes,.....	20	Glasgow.	26th Dec. 1865.	5 years.	12th Mar. 1866.	28th May 1867.	Attempted Suicide.	Weak-minded.	Before.	Removed to General Prison, Perth, on 20th March 1868.
3	67/8	Ann Ross or Fraser, ...	44	Glasgow.	24th April 1867.	10 years.	28th May 1867.	28th May 1867.	Suicidal.	Nervous.	Before.	Cut her arm with a pair of scissors.
4	68/17	Ann Riddel or Pitcairn, ...	40	Aberdeen.	17th April 1868.	7 years.	17th June 1868.	17th June 1868.	Epileptic.	Unknown.	Before.	
5	68/25	Elizabeth M'Gregor or Thomson, ...	29	Edinburgh.	11th May 1868.	7 years.	19th June 1868.	19th June 1868.	Epileptic.	Unknown.	Before.	

Robert Dobbie, M.D., L.R.C.S.E.

No. XIX.

STATE OF THE ACCOUNTS

OF THE

MANAGERS APPOINTED UNDER "THE PRISONS (SCOTLAND) ADMINISTRATION ACT," FOR THE YEAR 1868.

Receipts—being Charge.

Balance on 1st January 1868,	£5,345	4	0
Amount received from the Queen's and Lord Treasurer's Remembrancer during the year,	23,132	17	3
Amount received at the General Prison for manufactured goods during the year,	5,413	17	10
Amount received for issues from the Store for the Prison,	1,003	14	9
Amount received at the General Prison for Old Stores during the year,	121	6	2
Bank interest during the year,	19	1	11
AMOUNT OF CHARGE,	£35,036	1	11

Expenditure—being Discharge.

I. MANAGERS' OFFICE.			
Salaries,	£1,270	0	0
Travelling Expenses,	154	9	0
Incidental Expenses,	144	13	9
II. GENERAL PRISON.			
Salaries and Wages,	7,424	4	9
Uniforms for Officers,	237	15	7
Victualling for Prisoners,	5,641	10	7
Clothing for Prisoners,	955	5	2
Bedding for Prisoners,	179	7	7
Medicines, Surgical Instruments, etc.,	85	13	2
Gratuities to Prisoners,	754	0	7
Furniture, kitchen utensils, crockery, etc.,	187	3	10
Fuel and light,	1,101	13	6
Soap, scouring and cleaning articles,	265	3	9
Rent,	190	2	0
Rates and Taxes,	11	14	0
New buildings and alterations,	1,228	5	3
Ordinary repairs of buildings,	579	5	1
Incidental expenses,	158	10	1
Payments for material and implements for manufacturing department,	4,470	10	0
Profits from Prisoners' labour during the year 1867, paid into Exchequer,	2,383	19	10
Amount paid into Exchequer by the Governor of the General Prison to reduce the balance in his hands,	1,650	0	0
III. AYR PRISON.			
Maintenance of Female Convicts in Prison of Ayr,	2,270	5	10
IV. Escort and conveyance of Prisoners,	1,717	1	0
Balance due by managers on 31st December 1868,	1,975	7	7
Whereof in Bank, £1,925 4 1			
Due by Managers, 50 3 6			
£1,975 7 7			
AMOUNT OF DISCHARGE,	£35,036	1	11

No. XX.—TABLE of the whole Assessments laid on at Meetings of the Prison Boards for the Counties in Scotland, in the Year 1863, in terms of "The Prisons (Scotland) Administration Act 1860," together with the Apportionments of such Assessments among the Landward Parts and Burghs respectively, according to the value of Property.

Counties, and Royal and Parliamentary Burghs situated therein.	For Current Expenses under § 32, and Apportionment thereof.	For Building Assessment under § 33, and Apportionment thereof.	Total Yearly Value of Property on which Assessment is divided and apportioned per § 34.
	£ s. d.	£ s. d.	£ s. d.
1. Aberdeen—			
Landward part,	1,226 7 10	530 4 0	687,320 0 0
Aberdeen,	428 3 1	185 1 4	239,956 10 0
Peterhead,	30 10 9	13 3 10	17,114 0 0
Inverury,	11 14 2	5 1 2	6,561 19 5
Kintore,	3 4 2	1 7 7	1,798 19 8
	1,700 0 0	734 17 11	952,751 9 1
2. Argyle—			
Landward part,	559 19 9	...	350,225 10 8
Campbeltown,	22 17 2	...	14,297 16 9
Inveraray,	4 8 3	...	2,759 6 0
Oban,	12 14 10	...	7,967 6 0
	600 0 0	...	375,249 19 5
3. Ayr—			
Landward part,	1,948 13 11¾	...	898,584 10 6
Ayr,	111 6 3½	...	51,329 2 0
Irvine,	29 11 8¾	...	13,642 8 6
Kilmarnock,	110 8 0¼	...	50,908 5 0
	2,200 0 0	...	1,014,464 6 0
4. Banff—			
Landward part,	262 16 11½	...	186,428 1 8
Banff,	12 15 5½	...	90,58 14 6
Cullen,	4 7 7¾	...	3,106 10 7
	280 0 0	...	198,593 6 9
5. Berwick—			
Landward part,	272 5 4	...	347,262 19 2½
Lauder,	1 14 8	...	2,226 14 0
	274 0 0	...	349,489 13 2½
6. Bute—			
Landward part,	178 2 0	201 16 6	42,865 11 11
Rothesay,	121 18 0	138 3 6	29,341 5 2
	300 0 0	340 0 0	72,206 17 1
7. Caithness—			
Landward part,	195 5 3	...	110,064 3 0
Wick,	34 14 9	...	19,579 11 0
	230 0 0	...	129,643 14 0
8. Clackmannan—			
Landward part,	361 15 4	...	69,459 8 0

Counties, and Royal and Parliamentary Burghs situated therein.	For Current Expenses under § 32, and Apportionment thereof.	For Building Assessment under § 33, and Apportionment thereof.	Total Yearly Value of Property on which Assessment is divided and apportioned per § 34.
	£ s. d.	£ s. d.	£ s. d.
16. Inverness—			
Landward part,	784 10 0	...	264,791 7 7
Inverness,	115 10 0	...	38,983 0 0
	900 0 0	...	303,774 7 7
17. Kincardine—			
Landward part,	365 12 10	...	235,981 18 0
Inverbervie,	3 1 8	...	1,994 16 7
	368 14 6	...	237,976 14 7
18. Kinross—			
Landward part,	130 0 0	...	58,574 8 5
	130 0 0	...	58,574 8 5
19. Kirkcudbright,—			
Landward part,	342 1 11	141 9 3	238,460 3 7
Kirkcudbright,	6 19 6	2 17 8	5,882 13 1
New Galloway,	0 18 7	0 7 8	784 0 3
	350 0 0	144 14 7	295,126 16 11
20. Lanark—			
Landward part,	4,953 18 5	550 13 7	1,310,917 4 11
Glasgow,	6,855 6 9	762 0 8	1,814,074 0 0
Hamilton,	105 2 0	11 13 9	27,811 14 0
Rutherglen,	71 3 9	7 18 3	18,837 0 0
Airdrie,	76 18 1	8 11 0	20,351 0 0
Lanark,	37 11 0	4 3 7	9,936 0 0
	12,100 0 0	1,345 0 10	3,201,926 18 11
21. Linlithgow—			
Landward part,	380 4 2	...	195,534 4 8
Linlithgow,	14 4 8	...	7,320 0 6
Queensferry,	5 11 2	...	2,860 11 0
	400 0 0	...	205,714 16 2
22. Nairn—			
Landward part,	118 14 0	...	29,121 17 0
Nairn,	31 6 0	...	7,678 4 0
	150 0 0	...	36,800 1 0
23. Orkney—			
Landward part,	133 6 4	...	48,718 15 0
Kirkwall,	16 13 8	...	6,096 10 6

	£	s.	d.	£	s.	d.	£	s.	d.
9. Dumbarton—									
Landward part,	215	0	0	...			216,408	14	6
Dumbarton,	18	0	0	...			27,335	17	0
	233	0	0	...			243,744	11	6
10. Dumfries—									
Landward part,	449	13	4	...			439,878	10	9
Dumfries,	36	12	9	...			39,917	16	8
Annan,	8	8	5	...			9,172	17	6
Sanquhar,	3	0	0	...			3,266	13	0
Lochmaben,	2	5	6	...			2,473	7	6
	500	0	0	...			544,709	5	5
11. Edinburgh—									
Landward part,	1,747	16	0	...			494,362	0	0
Edinburgh,	3,526	7	6	...			997,428	0	0
Leith,	560	17	0	...			158,636	0	0
Musselburgh,	67	12	8	...			19,130	0	0
Portobello,	97	6	10	...			27,533	0	0
	6000	0	0	...			1,697,089	0	0
12. Elgin—									
Landward part,	291	7	4	...			153,438	7	0
Elgin,	40	4	5	...			21,181	11	9
Forres,	18	8	3	...			9,696	2	4
	350	0	0	...			184,316	1	1
13. Fife—									
Landward part,	1,042	11	7	80	3	10	664,523	11	10
Anstruther Easter,	6	6	7	0	9	8	4,033	18	5
Anstruther Wester,	2	18	9	0	4	6	1,871	9	8
Auchtermuchty,	3	16	9	0	5	10	2,439	15	8
Burntisland,	18	18	7	1	9	1	12,064	16	10
Crail,	4	14	5	0	7	3	3,008	3	1
Cupar,	21	18	8	1	13	8	13,980	16	11
Dunfermline,	47	19	2	3	13	9	30,571	5	8
Dysart,	28	5	11	2	3	6	18,037	1	11
Earlsferry,	0	15	9	0	1	2	500	8	0
Falkland,	3	13	1	0	5	7	2,328	16	10
Inverkeithing,	4	18	10	0	7	7	3,152	10	5
Kilrenny,	5	16	3	0	9	11	3,704	2	2
Kinghorn,	6	11	7	0	10	1	4,194	10	0
Kirkcaldy,	50	15	9	3	18	1	32,374	4	7
Newburgh,	6	9	10	0	9	11	4,137	1	11
Pittenweem,	8	2	2	0	12	5	5,167	17	2
St. Andrews,	35	6	4	2	14	2	22,511	9	0
	1,300	0	0	100	0	0	828,602	0	1
14. Forfar—									
Landward part,	1,274	0	3	...			569,153	2	0
Arbroath,	119	6	6	...			53,307	18	8
Brechin,	39	14	6	...			17,746	2	3
Dundee,	740	19	5	...			331,022	11	0
Forfar,	46	10	9	...			20,789	18	0
Montrose,	99	8	7	...			44,418	12	0
	2,320	0	0	...			1,036,438	3	11
15. Haddington—									
Landward part,	364	13	0	...			290,867	12	1
Haddington,	16	1	2	...			12,808	19	0
Dunbar,	13	5	0	...			10,570	7	4
North Berwick,	6	0	10	...			4,820	2	0
	400	0	0	...			319,067	0	5

	£	s.	d.	£	s.	d.	£	s.	d.
24. Peebles—									
Landward part,	180	9	6	...			127,140	18	11½
Peebles,	9	10	6	...			6,712	13	0
	190	0	0	...			133,853	11	11½
25. Perth—									
Landward part,	910	14	8	...			887,294	6	4
Perth,	87	18	10	...			85,678	19	1
Culross,	1	6	6	...			1,292	4	6
	1,000	0	0	...			974,265	9	11
26. Renfrew—									
Landward part,	1,151	19	0	...			422,481	11	5
Greenock,	546	15	8	...			200,535	0	0
Paisley,	313	7	0	...			114,923	13	0
Port-Glasgow,	65	8	10	...			24,000	0	0
Renfrew,	22	9	6	...			8,241	0	0
	2,100	0	0	...			770,181	4	5
27. Ross & Cromarty—									
Landward part,	468	13	3	...			225,743	4	10
Dingwall,	12	10	5	...			6,030	8	6
Tain,	9	9	3	...			4,558	13	0
Fortrose,	5	8	5	...			2,612	1	4
Cromarty,	3	18	8	...			1,894	8	0
	500	0	0	...			240,838	15	8
28. Roxburgh—									
Landward part,	587	7	8	...			423,110	11	10
Jedburgh,	12	12	4	...			9,931	18	6
	550	0	0	...			433,042	10	4
29. Selkirk—									
Landward part,	261	12	0	...			78,824	14	0
Selkirk,	38	8	0	...			11,731	15	2
	300	0	0	...			90,556	9	2
30. Stirling—									
Landward part,	853	9	2	...			409,503	7	6
Stirling,	100	1	7	...			48,020	2	1
Falkirk,	46	9	3	...			22,293	4	0
	1,000	0	0	...			479,816	13	7
31. Sutherland—									
Landward part,	197	16	8	...			59,842	14	0
Dornoch,	2	3	4	...			656	10	0
	200	0	0	...			60,499	4	0
32. Wigtown—									
Landward part,	452	6	6	...			192,090	0	0
Stranraer,	29	17	8	...			12,691	6	0
Wigtown,	11	11	4	...			4,910	18	4
Whithorn,	6	4	6	...			2,643	18	8
	500	0	0	...			21,2336	3	0
33. Zetland—									
Landward part,	160	0	0	...			30,190	0	0
	160	0	0	...			30,190	0	0
Total,	38,097	9	10	2,664	13	4	15,836,114	7	0¾

No. XXI.—Tables containing Classified Statements of the Current Expen

1. Abstract of Returns of Expenditure under the Prison Boards of the several Counties, chargeal

COUNTIES.	NAMES OF PRISONS.	Expenditure for the Year ended 30th June 1868. For Prisons.	For Insane Prisoners boarded out.	For Prisoners from each County in Prisons of other Counties.	For General Management.	For Retired Allowances.	For Interest.	Total Expendit
1	2	3	4	5	6	7	8	9
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s.
1. Aberdeen	Aberdeen	1,480 13 4						
	Peterhead	150 12 7½	...	...	117 8 2	123 4 0	17 13 1	1,963
	Huntly	35 6 2						
	Fraserburgh	38 5 9						
2. Argyle	Inveraray	252 6 10						
	Campbeltown	277 9 3	...	...	43 19 8	...	...	644
	Tobermory	70 11 4						
3. Ayr	Ayr	2,847 17 8						
	Kilmarnock	387 0 0	...	...	107 8 3	50 0 0	48 10 1	3,440 16
4. Banff	Banff	239 17 2						
	Keith	15 11 11	...	...	43 8 5	...	...	298 17
5. Berwick	Greenlaw	256 19 4						
	Dunse	39 9 3½						
	Lauder	1 5 6	...	0 4 0	26 4 0	20 0 0	...	346 12
	Earlstown	2 10 0						
6. Bute	Rothesay	372 5 9½	...	14 18 5	21 5 3	20 0 0	6 14 5	435
7. Caithness	Wick	212 10 5½	...	...	25 0 0	...	...	237 10
8. Clackmannan	Alloa	420 16 5	...	...	40 15 0	...	...	461 11
9. Dumbarton	Dumbarton	396 13 3						
	Helensburgh	30 14 0	...	5 9 3	26 0 0	...	...	494 15
	Kirkintilloch	35 19 2						
10. Dumfries	Dumfries	536 16 9	...	...	25 17 6	...	...	562 14
11. Edinburgh	Edinburgh	7,155 3 7						
	Court Buildings	202 10 6						
	Canongate	0 4 6	...	...	353 19 3	218 8 7	17 6 5	8,029 18
	Musselburgh	82 5 4						
12. Elgin	Elgin	407 19 1½						
	Forres	28 4 8	...	6 11 6	29 11 0	...	...	472
13. Fife	Cupar	880 6 3						
	Dunfermline	573 15 1	...	...	95 5 3	48 8 4	9 13 8	1,607
14. Forfar	Arbroath	4 17 2						
	Brechin	8 7 3						
	Dundee	2,181 4 8	...	...	127 3 4	53 4 2	27 1 1	2,938 12
	Forfar	526 13 1						
	Montrose	10 2 7						
15. Haddington	Haddington	398 3 1½						
	Dunbar	46 14 1½	...	...	28 0 11	10 0 0	...	482 18
16. Inverness	Inverness	694 5 3						
	Fort-William	122 19 5						
	Portree	113 17 7	...	...	61 3 8	...	...	1,112
	Lochmaddy	120 0 10						
17. Kincardine	Stonehaven	278 16 11	...	15 9 5	26 11 6	...	...	320 17
18. Kinross	Kinross	156 4 7	...	...	12 9 6	...	...	168 1
19. Kirkcudbright	Kirkcudbright	322 0 3						
	Maxwelltown	37 11 1	...	2 1 8	33 16 6	...	5 1 2	400 1
20. Lanark	Glasgow	1238 15 2½						
	Airdrie	833 5 2	...	...	387 4 6	40 0 0	...	13679
	Hamilton	726 10 10						
	Lanark	403 6 7						
	Carry forward,	35,705 16 8¾	...	44 14 3	1632 11 8	583 5 1	131 19 11	38,098

* In addition to the above expenditure, the County Board incurred an expenditure under the Reformatory Act of £29, 0s. 9d.

† Repaid £2,252, 0s. 4d. for maintenance of Female Convicts.

e several Prisons in Scotland, for the Year ended on 30th June 1868.

General Fund for Current Annual Expenses, for the Year ended 30th June 1868.

COUNTIES.	NAMES OF PRISONS.	Expenditure for the Year ended 30th June 1868. For Prisons.	For Sick and Insane Prisoners boarded out.	For Prisoners from each County in Prisons of other Counties.	For General Management.	For Retired Allowances.	For Interest.	Total Expenditu
1	2	3	4	5	6	7	8	9
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s.
	Brought forward,	35705 16 8¾	...	44 14 3	1632 11 8	583 5 1	131 19 11	38098 7
1. Linlithgow .	Linlithgow .	507 0 2	...	5 4 4	48 1 4	...	...	560 5
2. Nairn . .	Nairn . .	145 13 2	...	0 2 0	15 8 7	...	...	161 3
3. Orkney .	Kirkwall .	108 3 2	...	...	34 1 11	...	0 14 7	142 19
4. Peebles .	Peebles . .	256 5 8	...	1 10 0	20 7 6	...	...	278 3
5. Perth . .	Perth . .	1,167 8 3	...	...	65 2 0	...	...	1,391 19
	Dunblane .	159 9 7						
6. Renfrew . .	Paisley . .	2,023 6 4	...	11 13 9	136 16 1	...	12 6 2	2,859 13
	Greenock .	614 19 2						
	Pollockshaws .	60 11 10						
7. Ross and Cromarty	Dingwall .	220 10 10	...	...	160 18 6	...	...	603 11
	Tain . .	80 2 4						
	Cromarty .	48 8 5						
	Stornoway .	93 11 1						
8. Roxburgh .	Jedburgh .	541 0 3	...	3 17 0	66 3 3	7 0 0	...	703 13
	Hawick . .	48 3 0						
	Kelso . .	37 9 11						
9. Selkirk .	Selkirk . .	237 12 8½	...	...	44 11 7	...	...	282 4
10. Stirling .	Stirling . .	1,304 11 5	...	...	53 3 1	11 7 6	...	1,430 17
	Falkirk . .	61 15 1½						
11. Sutherland .	Dornoch .	233 1 0	...	...	24 6 0	2 18 0	5 9 8	265 14
12. Wigtown .	Stranraer .	314 2 11	...	...	56 19 6	...	...	541 19
	Wigtown .	170 17 4¾						
13. Zetland .	Fort-Charlotte	182 7 11½	...	...	13 2 0	2 18 4	...	198 8
	Total,	44,322 8 5	...	67 1 4	2371 13 0	607 8 11	150 10 4	47,519 2

2.—Abstract of Returns of Expenditure under the Prison Boards of the several Counties in Scotland, chargeable on the Special Fund for Building, Altering, and Repairing Local Prisons, in the year ended 30th June 1868.

COUNTIES.	PRISONS.	Expenditure for the Year ended 30th June 1868. For Prisons.	For Interest.	For Stamps.	Total.
1.	2.	3.	4.	5.	6.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1. Aberdeen .	Aberdeen . .	896 3 3	...	...	906 1 9
	Peterhead . .	6 19 7			
	Fraserburgh . .	2 18 11			
2. Ayr . .	Ayr . . .	327 12 11	...	...	329 1 11
	Kilmarnock .	1 9 0			
3. Bute . .	Rothesay . .	917 14 4	1 2 8	...	918 17 0
4. Elgin . .	Elgin . .	60 6 11	54 5 10	...	114 12 9
5. Forfar . .	Dundee . .	36 3 0	...	...	36 3 0
6. Inverness .	Inverness . .	94 18 5	...	...	94 18 5
7. Lanark .	Glasgow . .	3,313 14 4	...	...	3,324 8 11
	Lanark . .	10 14 7			
8. Perth . .	Perth . .	77 10 3	...	...	504 13 8
	Dunblane . .	427 3 5			
9. Roxburgh . .	Jedburgh . .	2 15 6	...	...	11 14 0
	Hawick . .	8 18 6			
	Total, .	6,185 2 11	55 8 6	...	6,240 11 5

3. CLASSIFICATION of the Current Expenditure (exclusive of Labour Account) in each Prison in Scotland, for the Year ended 30th June 1868.

COUNTIES.	PRISONS.	Salaries and Wages.	Furniture, Fittings, and Utensils.	Prison Diet.	Contingent Alimentary Charges.	Clothing.	Bedding.	Lighting.	Fuel.	General Contingent Charges, including ordinary Current Repairs not Charged against the Building Fund.	TOTAL.
1	2	3	4	5	6	7	8	9	10	11	12
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1. Aberdeen	Aberdeen	827 9 6	15 8 9	309 17 11	12 10 4	52 9 3	21 7 2	41 14 7	54 8 0	145 16 10	1,480 13 4
	Peterhead	70 0 0	0 8 7	26 17 4½	0 9 0	3 12 11	0 19 0	5 16 7	17 6 9	25 2 5	150 12 7½
	Huntly	18 3 0	0 5 0	2 9 6	0 0 9	...	0 3 6	0 17 6	7 14 7	5 12 4	35 6 2
	Fraserburgh	17 2 0	0 10 6	3 0 0	0 0 4	0 3 9	1 11 6	1 4 11	1 9 0	13 3 9	38 5 9
2. Argyle	Inveraray	155 12 0	0 16 0	44 2 1	0 17 8	8 8 0	0 18 0	12 1 9	20 4 0	9 7 4	252 6 10
	Campbeltown	122 19 0	9 8 2	67 7 4	5 8 0	5 8 0	4 10 0	9 5 5	29 10 0	23 13 4	277 9 3
	Tobermory	43 16 0	...	3 4 7	...	...	...	1 9 5	9 5 0	12 16 4	70 11 4
3. Ayr	Ayr	968 13 0	39 3 9½	907 15 4	52 2 8	201 17 5½	74 18 8	91 8 7	117 18 9	393 19 5	2,847 17 8
	Kilmarnock	177 12 0	1 10 0	84 4 1	4 10 10	20 13 9	3 17 6	12 3 6	20 17 4	61 11 0	387 0 0
4. Banff	Banff	118 8 0	7 13 1	46 0 3½	2 4 0½	9 15 5	2 3 6	8 9 7	23 11 6	21 11 9	239 17 2
	Keith	11 2 0	0 2 6	0 10 9½	...	0 7 3	...	...	1 10 9	1 18 7½	15 11 11
	Greenlaw	140 12 0	...	63 2 11	...	8 1 0	5 15 4	3 1 8½	17 4 2	19 2 2½	256 19 4
5. Berwick	Dunse	20 0 0	...	3 17 3½	...	...	...	1 18 11	5 4 10	8 8 3	39 9 3½
	Lauder	...	...	...	...	...	...	...	...	1 5 6	1 5 6
	Earlstown	...	...	...	...	...	...	...	...	2 10 0	2 10 0
6. Bute	Rothesay	87 17 6	13 14 4½	80 12 2½	6 1 1	27 3 6½	18 4 5	11 16 3	50 8 6	76 7 11	372 5 9½
7. Caithness	Wick	118 13 0	6 5 2½	42 3 5	...	4 5 0	3 6 6	12 19 0	21 17 6	3 0 10	212 10 5½
8. Clackmannan	Alloa	191 13 6	7 18 5	63 0 1	...	27 15 1	9 8 9	12 8 4	24 1 7	84 10 8	420 16 5
9. Dumbarton	Dumbarton	221 12 0	4 12 8	103 9 3	3 2 0	18 16 3	4 18 10	12 11 3	20 16 8	6 14 4	396 13 3
	Helensburgh	17 5 0	...	3 19 4	...	...	...	1 17 6	2 6 0	5 6 2	30 14 0
	Kirkintilloch	14 9 0	...	6 8 0	...	...	...	2 0 6	3 19 1	9 2 7	35 19 2
10. Dumfries	Dumfries	299 8 0	11 17 7	129 10 0	6 0 5	20 14 7	7 18 10	11 11 5	30 14 4	19 1 7	586 16 9
11. Edinburgh	Edinburgh	2,758 3 2	148 6 2	1,585 18 8	80 12 9	973 14 11	...	162 5 10	254 18 10	1,191 8 3	7,155 3 7
	Court Buildings' Prison	99 6 10	1 15 11	43 13 11	...	...	...	15 0 0	14 15 4	27 18 6	202 10 6
	Canongate	...	...	...	...	...	...	...	...	0 4 6	0 4 6
	Musselburgh	57 10 8	0 15 2	9 15 11	...	...	...	4 6 10	4 17 11	4 18 10	82 5 4
12. Elgin	Elgin	192 11 10	10 3 8	65 1 6½	20 4 2	16 10 8½	3 8 7	9 5 2	43 0 0	47 13 5½	407 19 1½
	Forres,	15 0 0	0 14 0	4 5 10	0 8 7	1 15 6	...	0 7 1	2 6 8	3 7 0	28 4 8
13. Fife	Cupar	432 1 8	3 16 1	169 0 4	15 15 9	51 14 10	3 10 8	42 6 1	52 0 10	110 0 0	880 6 3
	Dunfermline	230 6 7	40 17 6	109 0 10	0 19 11	56 18 0	3 12 6	21 3 6	36 11 1	74 5 2	573 15 1
14. Forfar	Arbroath	2 2 0	...	...	...	...	...	...	...	2 15 2	4 17 2
	Brechin	2 2 0	...	...	...	...	...	...	...	6 5 8	8 7 3
	Dundee	866 17 7	38 10 10	656 2 8	19 6 4	132 0 7	31 12 0	80 9 3	65 19 6	290 5 11	2,181 4 8
	Forfar	234 1 7	6 9 5½	146 17 5½	1 7 8½	20 3 4½	2 18 0	18 7 6	29 5 4	67 2 8	526 13 1
	Montrose	2 2 0	...	...	...	...	...	...	...	8 0 7	10 2 7

| | | |

No. XXI.
Continued.

4. AVERAGE EARNINGS A

Comparative Statement of the Total Number of Criminal Prisoners confined in each of the Prisons each such Prisoner; and the Daily Average Number of such Prisoners; as also of their Ave

COUNTIES.	PRISONS.	Total Number in Confinement during the Year.	Average Duration of Confinement of each Criminal Prisoner. Days.	Average Daily Number in Custody entered to the nearest Unit.	Average Cost per Prisoner for the Year ended 30th June 1868.				
					Salaries and Wages.	Prison Diet.	Clothing.	Bedding.	Lighti
1	2	3	4	5	6	7	8	9	10
					£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s.
1. Aberdeen	Aberdeen	1,031	21	60	13 15 8	5 3 3	0 17 5	0 7 1	0 13
	Peterhead	91	20	5	14 0 0	5 7 6	0 14 7	0 3 9	1 3
2. Argyle	Inveraray	130	23	8	19 9 0	5 10 3	1 1 0	0 2 3	1 10
	Campbeltown	98	34	9	13 13 3	7 9 9	0 12 0	0 10 0	1 0
3. Ayr	Ayr	688	65	123	7 17 6	7 7 7	1 12 10	0 12 2	0 14
	Kilmarnock	173	23	11	16 2 11	7 13 1	1 17 7	0 7 1	1 2
4. Banff	Banff	93	31	8	14 16 0	5 15 0	1 4 5	0 5 5	1 1
5. Berwick	Greenlaw	119	34	11	12 15 8	5 14 9	0 14 8	0 10 6	0 5
6. Bute	Rothesay	141	23	9	9 15 3	8 19 1	3 0 4	2 0 6	1 6
7. Caithness	Wick	69	27	5	23 14 7	8 8 8	0 17 0	0 13 3	2 11
8. Clackmannan	Alloa	122	27	9	21 5 11	7 0 0	3 1 8	1 1 0	1 7
9. Dumbarton	Dumbarton	331	20	18	12 6 3	5 14 11	1 0 11	0 5 6	0 13
10. Dumfries	Dumfries	439	19	23	13 0 4	5 12 7	0 18 0	0 6 11	0 10
11. Edinburgh	Edinburgh	2,160	21	344	8 0 4	4 12 3	2 16 7	...	0 9
	Court Buildings' Prison			9	11 0 9	4 17 1	...	...	1 13
12. Elgin	Elgin	152	24	10	19 5 2	6 10 2	1 13 1	0 6 10	0 18
13. Fife	Cupar	392	26	28	15 8 8	6 0 9	1 17 0	0 2 6	1 10
	Dunfermline	220	22	13	17 14 4	8 7 9	2 16 9	0 5 7	1 12
14. Forfar	Dundee	1,768	21	101	8 11 8	6 9 11	1 6 2	0 6 3	0 15
	Forfar	259	31	22	10 12 10	6 13 6	0 18 4	0 2 8	0 16
15. Haddington	Haddington	239	20	14	12 11 5	7 2 10	0 18 2	0 1 0	0 18
16. Inverness	Inverness	199	24	13	32 14 4	6 19 6	1 8 2	0 15 0	2 15
17. Kincardine	Stonehaven	103	32	9	15 16 11	5 19 10	1 8 1	0 1 0	1 7
18. Kinross	Kinross*	...	...	...	...	...	...	...	...
19. Kirkcudbright	Kirkcudbright	66	28	5	44 7 0	6 12 9	0 10 9	0 3 7	2 1
20. Lanark	Glasgow	7,713	25	534	7 8 4	5 19 1	1 19 0	0 9 7	0 12
	Airdrie	1,041	13	38	9 8 4	5 0 2	1 3 4	0 6 10	0 14
	Hamilton	584	17	27	11 15 1	5 10 0	1 11 0	0 11 0	0 17
	Lanark	161	27	12	18 16 7	6 5 1	1 4 5	0 6 10	0 12
21. Linlithgow	Linlithgow	304	28	23	10 1 3	5 1 2	0 9 1	0 11 1	0 2
22. Nairn	Nairn*	...	...	...	...	...	...	...	...
23. Orkney	Kirkwall*	...	...	...	...	...	...	...	...
24. Peebles	Peebles	107	17	5	20 6 7	7 1 3	2 10 5	1 7 7	1 6
25. Perth	Perth	598	31	50	11 10 5	5 8 4	0 19 2	0 12 8	1 1
	Dunblane	150	15	6	13 13 4	5 12 2	1 6 1	...	0 16
26. Renfrew	Paisley	1,281	33	117	6 13 0	5 0 8	1 3 2	0 7 3	0 11
	Greenock	1,277	9	30	10 1 6	4 17 9	1 3 6	0 9 10	0 10
27. Ross and Cromarty	Dingwall*	41	36	...	...	...	...	...	...
28. Roxburgh	Jedburgh	227	21	13	22 17 10	6 2 11	3 3 7	0 9 7	1 1
29. Selkirk	Selkirk	132	17	6	22 0 10	6 8 6	1 11 1	0 4 10	1 5
30. Stirling	Stirling	845	28	52	10 3 5	5 11 11	2 18 1	0 10 3	1 2
31. Sutherland	Dornoch*	...	20	...	...	...	...	...	...
32. Wigtown	Stranraer	68	27	5	26 6 4	7 3 5	4 6 1	1 18 6	0 19
	Wigtown*	...	...	...	...	...	...	...	...
33. Zetland	Fort-Charlotte*	...	...	...	...	...	...	...	...
25. Perth	General Prison	329	202	735	10 8 7	7 7 4	2 1 10	0 7 10	0 12
In Scotland	Whole Prisons	30,065	31	2,551	10 7 1	6 5 0	1 18 4	0 7 7	0 14

In the Prisons marked with an asterisk the average number of Prisoners was under five.

(No. XXI. *Continued.*)

OST PER HEAD FOR THE YEAR.

which the Average Daily Number in Custody is Five or upwards; the Average Duration of Confinement of Yearly Cost per Head, and Average Earnings, all for the Year ended **30th June 1868.**

Fuel.	Gross Cost per Head, including all Expenses.	Average Earnings per Head available for Prison.	Nett Cost per Head after deducting Earnings.	Earnings of Prisoners who have been in Confinement for Periods of Six Months, or upwards (under Sentence).			PRISONS.	COUNTIES.
				Average Daily Number of such Prisoners.	Total Earnings.	Average Earnings.		
11	12	13	14	15	16	17	2	1
£ s. d.	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.		
0 18 1	24 13 6	3 10 8	21 2 10	4	13 9 7	3 7 5	Aberdeen	1. Aberdeen
3 9 4	30 2 6	2 3 6	27 19 0	...	...	...	Peterhead	
2 10 6	31 10 10	2 4 11	29 5 11	...	...	...	Inveraray	2. Argyle
3 5 7	30 16 7	2 14 9	28 1 10	...	...	...	Campbeltown	
0 19 2	23 3 1	3 17 4	19 5 9	93	397 12 0	4 5 6	Ayr	3. Ayr
1 17 11	35 3 8	5 19 1	29 4 7	...	...	...	Kilmarnock	
2 18 11	29 19 8	3 10 3	26 9 5	...	...	...	Banff	4. Banff
1 11 3	23 7 3	1 14 0	21 13 3	...	...	...	Greenlaw	5. Berwick
5 12 0	41 7 3	2 9 4	38 17 11	1	7 11 8	7 11 8	Rothesay	6. Bute
4 7 6	42 10 1	1 4 3	41 5 10	...	...	...	Wick	7. Caithness
2 13 6	46 15 2	2 5 1	44 10 1	...	...	...	Alloa	8. Clackmannan
1 3 2	22 0 8	2 0 2	20 0 6	3	8 1 6	2 13 10	Dumbarton	9. Dumbarton
1 6 9	23 6 10	5 5 8	18 1 2	...	...	...	Dumfries	10. Dumfries
0 14 10	20 16 0	2 7 2	18 8 10	29	91 17 6	3 3 4	Edinburgh	11. Edinburgh
1 12 10	22 10 1	...	22 10 1	...	...	...	Court Buildings' Prison	
4 6 0	40 15 11	6 4 6	34 11 5	1	7 0 0	7 0 0	Elgin	12. Elgin
1 17 2	31 8 10	3 18 3	27 10 7	...	...	...	Cupar	13. Fife
2 16 3	44 2 8	3 12 2	40 10 6	...	...	...	Dunfermline	
0 13 1	21 11 11	4 3 11	17 8 0	12	43 4 2	3 12 0	Dundee	14. Forfar
1 6 7	23 18 9	2 13 3	21 5 6	2	8 14 0	4 7 0	Forfar	
1 17 7	28 8 10	3 8 8	25 0 2	...	...	...	Haddington	15. Haddington
3 14 8	53 8 1	10 14 10	42 13 3	1	14 4 6	14 4 6	Inverness	16. Inverness
2 9 0	30 19 8	1 16 11	29 2 9	...	...	...	Stonehaven	17. Kincardine
...	...	...	...	...	...	...	Kinross	18. Kinross
4 0 3	64 8 0	7 10 7	56 17 5	...	...	...	Kirkcudbright	19. Kirkcudbright
0 11 7	21 0 11	2 10 3	18 10 8	66	280 3 5	4 4 11	Glasgow	20. Lanark
0 16 9	23 4 11	2 14 2	20 10 9	3	9 7 9	3 2 7	Airdrie	
1 9 3	26 18 2	2 6 9	24 11 5	1	3 0 0	3 0 0	Hamilton	
2 4 6	33 12 3	4 6 0	29 6 3	3	13 7 0	4 9 0	Lanark	
0 13 6	22 0 11	2 17 1	19 3 10	2	7 12 1	3 16 1	Linlithgow	21. Linlithgow
...	...	...	...	...	...	...	Nairn	22. Nairn
...	...	...	...	...	...	...	Kirkwall	23. Orkney
3 17 7	51 5 2	0 15 4	50 9 10	...	...	...	Peebles	24. Peebles
0 16 2	23 6 11	3 6 8	20 0 3	6	30 0 0	5 0 0	Perth	25. Perth
1 16 1	26 11 7	1 5 1	25 6 6	...	...	...	Dunblane	
0 13 3	17 5 10	2 1 8	15 4 2	12	58 12 3	4 17 8	Paisley	26. Renfrew
1 3 4	20 10 0	2 9 0	18 1 0	...	...	...	Greenock	
...	...	...	...	...	...	...	Dingwall	27. Ross and Cromarty
2 12 4	41 12 4	5 3 7	36 8 9	2	8 17 6	4 8 9	Jedburgh	28. Roxburgh
2 9 9	39 12 1	3 6 1	36 6 0	...	...	...	Selkirk	29. Selkirk
1 5 1	25 1 9	2 7 10	22 13 11	6	18 4 9	3 0 9	Stirling	30. Stirling
...	...	...	...	...	...	...	Dornoch	31. Sutherland
2 19 0	62 16 7	5 5 6	57 11 1	...	...	...	Stranraer	32. Wigtown
...	...	...	...	...	...	...	Wigtown	
...	...	...	...	...	...	...	Fort-Charlotte	33. Zetland
0 17 2	*25 0 2	4 13 11	*20 6 3	†689	3,452 16 10	5 0 3	General Prison	25. Perth
1 1 0	24 11 7	3 8 6	21 3 1	936	4,473 16 6	4 15 7	Whole Prisons	In Scotland

* Includes Travelling Expenses of Prisoners on their liberation, averaging 3s. 4d. per head.

† Exclusive of Inmates of Department for Criminal Lunatics.

(No. XXI. *Continued.*)

5. VIEW of the OUTLAY connected with the Prisoners' Labour in the several Prisons

COUNTIES.	PRISONS.	DEBTOR. Undisposed-of Goods and Materials, and Implements of Labour, on hand at 30th June 1867.	DEBTOR. Outlay this Year for Materials, Implements, Carriage of Goods, &c.	DEBTOR. Loss by Bad Debts.	DEBTOR. Sum of Debit.	CREDITOR. Sales and Deliveries of Work to Purchasers and Employers.	CREDITOR. Furniture and Goods issued for the use of the Prison other than Implements of Labour
1	2	3	4	5	6	7	8
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1. Aberdeen	Aberdeen	83 11 9	174 3 9	...	257 15 6	299 6 0	2 15
	Peterhead	10 6 3	14 13 6	0 5 7½	25 5 4½	29 18 1½	...
2. Argyle	Inveraray	14 12 6	10 10 5	...	25 2 11	7 9 9	...
	Campbeltown	1 0 0	0 12 6	...	1 12 6	4 0 2	...
	Tobermory*	0 10 0	0 7 0	...	0 17 0	0 10 0	...
3. Ayr	Ayr	36 6 0	178 8 5½	...	214 14 5½	494 1 4½	0 3
	Kilmarnock	38 11 7	64 11 2	...	103 2 9	79 1 1	0 11
4. Banff	Banff	7 1 0	35 15 7½	...	42 16 7½	55 11 1½	...
5. Berwick	Greenlaw	6 5 5	21 9 11½	...	27 15 4½	34 7 2½	4 10
6. Bute	Rothesay	1 9 6	9 7 10	...	10 17 4	13 14 10	...
7. Caithness	Wick	29 3 6	0 6 3	...	29 9 9	4 5 0	2 19
8. Clackmannan	Alloa	3 7 9	4 9 10	...	7 17 7	11 2 4	5 2
9. Dumbarton	Dumbarton	2 4 0	56 18 0	1 4 6	60 6 0	80 1 3	2 11
10. Dumfries	Dumfries	9 6 8	45 7 10	...	54 14 6	74 10 6	3 18
11. Edinburgh	Edinburgh	425 3 11	565 15 6	...	990 19 5	815 10 0	136 19
12. Elgin	Elgin	33 16 0	49 0 3	0 2 6	82 13 9	67 5 2	5 11
13. Fife	Cupar	30 0 0	38 12 6	...	68 12 6	110 11 9	3 0
	Dunfermline	11 10 6	36 0 9	...	47 11 3	48 10 5	4 2
14. Forfar	Dundee	24 8 2	12 3 4	...	36 11 6	325 13 5	27 4
	Forfar	4 2 5	32 1 7	...	36 4 0	63 9 4	...
15. Haddington	Haddington	28 6 6½	25 18 2	0 5 0	54 9 8½	43 12 10	1 0
16. Inverness	Inverness	278 13 8	252 14 1	...	526 7 9	321 3 5	4 10
	Fort-William	1 12 0	1 0 0	...	2 12 0	6 10 9	...
	Portree	1 6 6	...	...	1 6 6	0 7 11	...
	Lochmaddy	4 15 0	...	...	4 15 0	3 7 4	...
17. Kincardine	Stonehaven	20 3 6	76 8 2	...	96 11 8	65 12 3	0 8
18. Kinross	Kinross	5 10 0	...	...	5 10 0	3 0 1	...
19. Kirkcudbright	Kirkcudbright	104 2 0	22 11 2	...	126 13 2	12 2 8	9 16
20. Lanark	Glasgow	370 13 10	703 19 2	...	1,074 13 0	1,050 1 6	...
	Airdrie	14 0 0	103 10 9	...	117 10 9	135 1 8	...
	Hamilton	23 0 0	68 14 1½	...	91 14 1½	86 6 11	0 10
	Lanark	11 5 0	40 16 4	...	52 1 4	66 1 0½	...
21. Linlithgow	Linlithgow	11 15 6	71 15 0	...	83 10 6	112 0 8	0 18
22. Nairn	Nairn	1 0 0	2 5 0	...	3 5 0	4 15 0	...
23. Orkney	Kirkwall	0 6 2	...	...	0 6 2	0 3 8	...
24. Peebles	Peebles	45 12 9½	5 17 1	...	51 9 10½	20 18 7	...
25. Perth	Perth	...	5 4 0	...	5 4 0	98 14 0	...
	Dunblane	...	...	...	...	5 13 7	...
26. Renfrew	Paisley	178 7 9	160 17 11	...	339 5 8	303 16 10	27 10
	Greenock	7 19 9	9 17 6	...	17 17 3	49 9 6	...
27. Ross & Cromarty	Dingwall	7 11 10	...	...	7 11 10	6 0 9	...
	Stornoway	5 13 10	...	...	5 13 10	...	...
28. Roxburgh	Jedburgh	28 12 6	2 16 2	...	31 8 8	32 8 8	3 0
29. Selkirk	Selkirk	11 14 1½	37 8 11½	...	49 3 1½	41 3 1	0 3
30. Stirling	Stirling	85 4 2	116 6 6	...	201 10 8	68 12 10	6 10
31. Sutherland	Dornoch	37 10 4½	14 19 4	...	52 9 8½	23 8 3	1 8
32. Wigtown	Stranraer	16 11 1	20 0 3½	...	36 11 4½	32 14 10	2 10
	Wigtown	39 4 0	0 13 0	...	39 17 0	24 13 0	2 13
33. Zetland	Fort-Charlotte	2 0 0	8 12 7	...	10 12 7	10 17 5	...
		2,110 8 10½	3,103 1 4½	1 17 1½	5,215 7 4½	5,247 12 5½	260 2
25. Perth	General Prison,	1,610 1 2	4,414 0 5	...	6,024 1 7	5,229 18 5	1,346 10
	TOTAL,	3,720 10 0½	7,517 1 9½	1 17 1½	11,239 8 11½	10,477 10 10½	1606 12

* The value of undisposed-of goods in the Prison of Lochgilphead at the 30th June 1867, was £1, 7s. 8d.

(No. XXI. *Continued.*)

n Scotland, and of the Returns therefrom, in the Year ended **30th June 1868.**

| CREDITOR. | | |

No. XXII.—TRIENNIAL COMPARISON OF AVERA

Comparative Statement of the Average Daily Number of Criminal Prisoners in the Pris
and of their Average Yearly Cost per Head, and Aver

COUNTIES.	PRISONS.	Average Daily Number in Custody.	Average Yearly Cost per Head in the three Years ended									
			Salaries and Wages.			Prison Diet.			Clothing.			Bedding.			Lighting		
1	2	3	4			5			6			7			8		
			£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1. Aberdeen	Aberdeen	59	13	7	7	4	12	11	0	18	3	0	4	7	0	12	1
2. Argyle	Inveraray	6	26	18	3	5	12	9	1	0	8	0	2	11	1	15	3
	Campbeltown	9	14	7	0	6	8	3	0	10	8	0	8	10	1	0	8
3. Ayr	Ayr	127	7	8	2	6	18	1	1	7	11	0	8	5	0	14	1
	Kilmarnock	15	12	11	3	6	7	10	1	9	4	0	7	11	0	15	5
4. Banff	Banff	6	20	2	6	6	11	0	0	19	9	0	6	6	1	4	5
5. Berwick	Greenlaw	7	18	19	4	5	10	10	1	1	7	0	5	6	0	10	5
6. Bute	Rothesay*	...	...			...			...			...			...		
7. Caithness	Wick*	...	...			...			...			...			...		
8. Clackmannan	Alloa	8	24	4	10	6	17	1	3	8	11	0	14	2	1	9	5
9. Dumbarton	Dumbarton	17	12	18	3	5	11	5	1	0	6	0	5	5	0	14	5
10. Dumfries	Dumfries	22	13	18	7	5	8	7	0	18	10	0	7	9	0	13	5
11. Edinburgh	Edinburgh	340	7	18	0	4	6	5	2	6	7	...			0	8	5
	Court Buildings	10	10	5	2	4	3	11	0	0	1	...			1	7	5
12. Elgin	Elgin	9	20	5	3	6	10	2	1	7	3	1	9	9	1	2	5
13. Fife	Cupar	24	17	8	7	5	12	7	0	15	8	0	5	0	1	4	5
	Dunfermline	11	22	9	5	6	10	1	1	12	2	0	4	11	1	8	5
14. Forfar	Dundee	88	9	15	4	5	19	5	1	11	7	0	5	4	0	16	5
	Forfar	18	12	14	7	6	3	3	0	13	4	0	3	9	0	17	5
15. Haddington	Haddington	12	16	4	5	6	18	10	1	0	4	0	4	11	1	0	5
16. Inverness	Inverness	13	32	16	4	6	17	10	1	10	10	0	18	4	2	14	5
17. Kincardine	Stonehaven	8	17	0	9	5	6	11	1	5	4	0	10	1	1	8	5
18. Kinross	Kinross*	...	...			...			...			...			...		
19. Kirkcudbright	Kirkcudbright	6	40	0	9	5	15	6	0	11	2	0	1	3	1	16	5
20. Lanark	Glasgow	511	7	9	8	5	13	6	2	0	3	0	7	9	0	11	5
	Airdrie	42	8	5	1	4	9	2	1	5	6	0	5	0	0	12	5
	Hamilton	26	12	2	8	5	5	0	1	18	7	0	8	2	0	15	5
	Lanark	10	22	18	11	5	11	4	1	0	1	0	7	9	0	14	5
21. Linlithgow	Linlithgow	22	10	7	1	4	16	2	0	16	0	0	7	5	0	8	5
22. Nairn	Nairn*	...	...			...			...			...			...		
23. Orkney	Kirkwall*	...	...			...			...			...			...		
24. Peebles	Peebles*	...	...			...			...			...			...		
25. Perth	Perth	42	14	5	3	5	5	5	1	4	2	0	7	1	0	18	5
26. Renfrew	Paisley	112	6	10	0	4	12	11	1	4	8	0	7	1	0	11	1
	Greenock	32	9	8	10	4	11	8	1	12	5	0	8	7	0	9	5
27. Ross & Cromarty	Dingwall*	...	...			...			...			...			...		
28. Roxburgh	Jedburgh	11	26	19	0	6	0	10	2	9	2	0	8	6	1	4	5
29. Selkirk	Selkirk*	...	...			...			...			...			...		
30. Stirling	Stirling	45	12	2	3	5	4	8	2	9	9	0	8	6	1	8	5
31. Sutherland	Dornoch*	...	...			...			...			...			...		
32. Wigtown	Stranraer*	...	...			...			...			...			...		
	Wigtown*	...	...			...			...			...			...		
33. Zetland	Fort-Charlotte*	...	...			...			...			...			...		
25. Perth	General Prison	724	10	3	4	6	18	6	2	1	3	0	7	4	0	11	5
In Scotland	Whole Prisons	2453	10	9	9	5	17	6	1	16	8	0	6	7	0	13	5

* In the Prisons marked with an asterisk the Average Number of Prisoners was under five.

YEARLY COST PER HEAD AND EARNINGS. No. XXII.

of Scotland in which the Average Daily Number of Prisoners in Custody is Five or upwards; Yearly Earnings in the Three Years ended **30th June 1868.**

June 30, 1868. Fuel.	Gross Cost per Head including all Expenses.	Average Earnings per Head, available for the Prison.	Nett Cost per Head, after deducting Earnings.	Average Earnings of Prisoners who have been in Confinement Six Months, or upwards, under Sentence.	PRISONS.	COUNTIES.
9	10	11	12	13	2	1
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.		
0 17 4	23 14 3	3 9 3	20 5 0	3 19 11	Aberdeen	1. Aberdeen
3 12 9	41 17 9	2 0 8	39 17 1	...	Inveraray	2. Argyle
3 12 0	29 15 10	2 12 11	27 2 11	...	Campbeltown	
0 17 5	22 11 0	3 6 0	19 5 0	3 15 8	Ayr	3. Ayr
1 9 2	28 0 2	4 6 8	23 13 6	...	Kilmarnock	
2 14 6	38 3 8	4 5 0	33 18 8	1 1 8	Banff	4. Banff
2 8 10	31 13 8	2 2 0	29 11 8	...	Greenlaw	5. Berwick
...	...	...	...	...	Rothesay	6. Bute
...	...	...	...	...	Wick*	7. Caithness
2 17 8	45 12 1	2 12 2	42 19 11	...	Alloa	8. Clackmannan
1 2 10	22 7 8	2 0 10	20 6 10	2 10 11	Dumbarton	9. Dumbarton
1 7 11	24 5 9	5 6 7	18 19 2	5 5 0	Dumfries	10. Dumfries
0 15 0	19 13 0	2 12 0	17 1 0	3 0 8	Edinburgh	11. Edinburgh
1 9 0	20 2 6	...	20 2 6	...	Court Buildings	
4 3 10	44 4 3	6 1 4	38 2 11	2 6 8	Elgin	12. Elgin
2 2 3	32 9 2	3 13 5	28 15 9	...	Cupar	13. Fife
2 10 4	45 14 9	3 8 10	42 5 11	...	Dunfermline	
0 16 1	23 6 7	4 6 9	18 19 10	4 7 6	Dundee	14. Forfar
1 11 11	26 11 7	3 15 4	22 16 3	4 15 7	Forfar	
2 5 8	33 9 0	3 12 5	29 16 7	...	Haddington	15. Haddington
3 16 3	54 5 0	11 16 4	42 8 8	15 2 7	Inverness	16. Inverness
2 13 10	30 15 7	2 4 9	28 10 10	...	Stonehaven	17. Kincardine
...	...	...	...	...	Kinross*	18. Kinross
3 17 11	57 5 10	4 3 11	53 1 11	...	Kirkcudbright	19. Kirkcudbright
0 12 6	20 16 8	2 11 1	18 5 7	5 5 7	Glasgow	20. Lanark
0 16 4	20 10 3	2 11 1	17 19 2	3 2 11	Airdrie	
1 8 11	27 4 4	2 16 3	24 8 1	...	Hamilton	
2 9 5	38 8 6	4 9 2	33 19 4	4 8 8	Lanark	
0 14 4	22 1 9	2 19 9	19 2 0	3 12 9	Linlithgow	21. Linlithgow
...	...	...	...	...	Nairn*	22. Nairn
...	...	...	...	...	Kirkwall*	23. Orkney
...	...	...	...	...	Peebles*	24. Peebles
0 18 11	26 4 2	3 13 7	22 10 7	4 9 0	Perth	25. Perth
0 14 6	16 14 7	2 3 2	14 11 5	4 11 11	Paisley	26. Renfrew
1 1 9	19 14 5	2 4 6	17 9 11	...	Greenock	
...	...	...	...	...	Dingwall	27. Ross & Cromarty
3 8 4	46 17 1	5 1 3	41 15 10	5 7 2	Jedburgh	28. Roxburgh
...	...	...	...	...	Selkirk*	29. Selkirk
1 12 8	26 17 0	2 5 5	24 11 7	2 18 0	Stirling	30. Stirling
...	...	...	...	...	Dornoch*	31. Sutherland
...	...	...	...	...	Stranraer	32. Wigtown
...	...	...	...	...	Wigtown	
...	...	...	...	...	Fort-Charlotte*	33. Zetland
0 18 6	24 5 3¼	4 6 1	19 19 2¼	4 11 10‡	General Prison	25. Perth
1 2 0	24 4 1	3 6 8	20 17 5	4 9 6	Whole Prisons	In Scotland

† Includes travelling expenses of prisoners on liberation, averaging 3s. 6d. per head. ‡ Exclusive of Insane.

No. XXIII.

ABSTRACT of Account of Expenses incurred by the Prison Managers (Scotland), through the Governor of the General Prison at Perth, and the Prison Boards of the several Counties, under Orders issued by the Secretary of State, in the conveyance of Convicts in charge of Escort Officers from Prisons in Scotland to Prisons in England, to the General Prison at Perth, and the Prison of Ayr, and the reconveyance of Officers, for the Year 1868.

	Prisons whence Removed.	Prisons to which Removed.	Convicts Removed.		Employed in Service.		Railway Fares.	Allowances according to Rule.	TOTAL.
			To Station Prisons.	To Convict Prisons.	No. of Officers.	No. of Days.			
1	Edinburgh,	Millbank,	..	2	2	4	£9 18 0	£6 13 10	
2	Edinburgh,	Ditto,	..	10	3	4	30 2 0	9 3 2	
3	Edinburgh	Ditto,	..	3	2	4	11 11 0	7 1 2	
4	Inverness,	Ditto,	..	2	2	6	18 17 6	9 7 0	
5	Glasgow,	Ditto,	..	9	4	4	28 1 0	12 10 0	
6	Aberdeen to Edinburgh,	Ditto,	3	..	..	..	....	8 4 10	
7	Dundee to Edinburgh,	Ditto,	1	..	..	..	....	2 14 4	
8	Jedburgh to Edinburgh,	Ditto,	1	..	..	..	....	3 8 4	
9	Stirling to Edinburgh,	Ditto,	4	..	..	..	....	4 19 6	
			9	26	13	22	£98 9 6	£64 2 2	£162 11 8
10	General Prison,	Portsmouth,	..	2	2	5	....	£17 18 11	
11	General Prison,	Ditto,	..	17	4	5	....	63 5 6	
			..	19	6	10	....	£81 4 5	81 4 5
12	General Prison,	Portland,	..	17	5	5	£63 18 4	£13 5 2	
13	General Prison,	Ditto,	..	6	3	5	29 10 0	6 19 8	
14	General Prison,	Ditto,	..	8	2	5	....	22 11 2	
15	General Prison,	Ditto,	..	17	4	6	....	70 17 2	
16	General Prison,	Ditto,	..	20	5	5	....	90 18 4	
17	General Prison,	Ditto,	..	14	4	5	....	63 8 2	
			..	77	23	30	£93 8 4	£267 19 8	361 8 0
18	General Prison,	Dartmoor,	..	6	3	6	....	£43 5 10	
19	General Prison,	Ditto,	..	2	2	6	....	20 19 11	
			..	8	5	12	....	£64 5 9	64 5 9
20	General Prison,	Woking,	..	2	2	..	£11 0 9	£5 16 8	
21	General Prison,	Ditto,	..	1	2	..	....	21 13 9	
			..	3	4	..	£11 0 9	£27 10 5	38 11 2
22	General Prison,	Millbank,	..	1	1	5	....	£8 3 3	8 3 3
23	Aberdeen,	General Prison,	..	2	2	..	....	£5 8 6	
24	Aberdeen,	Ditto,	..	2	2	..	....	5 16 0	
25	Ayr,	Ditto,	..	20	3	..	....	16 11 1	
26	Ayr,	Ditto,	..	3	2	..	....	7 16 6	
27	Ayr,	Ditto,	..	12	3	..	....	12 8 3	
28	Ayr,	Ditto,	..	13	3	..	....	13 14 4	
29	Edinburgh,	Ditto,	..	8	4	..	....	9 9 4	
30	Edinburgh,	Ditto,	..	15	4	..	....	12 16 4	
31	Edinburgh,	Ditto,	..	4	3	..	....	6 12 9	
32	Edinburgh,	Ditto,	..	7	3	..	....	8 5 3	
33	Edinburgh,	Ditto,	..	4	3	..	....	6 8 9	
34	Edinburgh,	Ditto,	..	1	2	..	....	2 19 8	
35	Dundee,	Ditto,	..	7	4	..	....	6 1 8	
36	Dundee,	Ditto,	..	2	2	..	....	3 11 10	
37	Dundee,	Ditto,	..	4	2	..	....	4 5 2	
38	Inverness,	Ditto,	..	1	2	..	....	6 5 0	
39	Inverness,	Ditto,	..	1	2	..	....	6 5 6	
40	Glasgow,	Ditto,	..	1	1	..	....	2 8 6	
41	Glasgow,	Ditto,	..	12	4	..	....	12 13 10	
42	Glasgow,	Ditto,	..	4	2	..	....	5 18 8	
43	Glasgow,	Ditto,	..	13	4	..	....	13 15 6	
44	Glasgow,	Ditto,	..	5	2	..	....	6 16 10	
45	Glasgow,	Ditto,	..	23	9	..	....	23 3 6	
46	Perth,	Ditto,	..	1	..	..	....	1 7 6	
47	Perth,	Ditto,	..	9	..	..	....	3 11 6	
48	Perth,	Ditto,	..	4	..	..	....	3 5 0	
49	Perth,	Ditto,	..	5	..	..	....	3 10 0	
50	Paisley,	Ditto,	..	1	1	..	....	2 13 8	
51	Paisley,	Ditto,	..	1	2	..	....	3 12 3	
52	Jedburgh,	Ditto,	..	1	2	..	....	6 6 10	
53	Stirling,	Ditto,	..	2	2	..	....	4 3 0	
			..	188	75	..	....	£227 17 6	227 17 6
54	Aberdeen,	Ayr,	..	2	2	..	....	£8 19 4	
55	Aberdeen,	Ditto,	..	1	2	..	....	7 7 9	
56	Edinburgh,	Ditto,	..	3	2	..	....	6 19 6	
57	Edinburgh,	Ditto,	..	1	2	..	....	4 6 0	
58	Edinburgh,	Ditto,	..	1	2	..	....	4 7 0	
59	Edinburgh,	Ditto,	..	1	2	..	....	4 7 0	
60	Edinburgh,	Ditto,	..	4	3	..	....	8 18 6	
61	Dundee,	Ditto,	..	3	2	..	....	8 6 7	
62	Dundee,	Ditto,	..	2	2	..	....	7 13 6	
63	Glasgow,	Ditto,	..	6	3	..	....	6 17 0	
64	Glasgow,	Ditto,	..	6	3	..	....	6 17 0	
65	Glasgow,	Ditto,	..	9	3	..	....	8 4 9	
66	Glasgow,	Ditto,	..	2	2	..	....	2 12 2	
67	Glasgow,	Ditto,	..	2	2	..	....	4 1 6	
			..	43	32	..	....	£89 17 7	89 17 7
									£1013 19 4

No. XXIV.

ABSTRACT of the Accounts rendered by County Prison Boards to Exchequer, for maintenance, after conviction, of Criminal Prisoners confined in Local Prisons who had been tried, with a Jury, or by the Sheriffs without a Jury, where proceedings were conducted under Sheriffs' Warrants—For the two **Half-Years ended 31st March and 30th September 1868,** respectively, and for previous periods for which Accounts were not rendered at the proper time.

COUNTIES.	For Prisoners tried by Jury.		For Prisoners tried without Jury.		TOTAL.
	Half-Year to 31st March 1868.	Half-year to 30th Sept. 1868.	Half-year to 31st March 1868.	Half-year to 30th Sept. 1868.	
1. Aberdeen,	£31 8 5	£61 15 8	£47 6 6	£49 13 3	£190 3 10
2. Argyle,	43 15 8	33 5 7	19 12 6	25 1 11	121 15 8
3. Ayr,	60 17 6	52 19 7	87 12 1	67 8 3	268 17 5
4. Banff,	10 0 0	28 10 9	16 11 3	15 4 6	70 6 6
5. Berwick,	23 4 1	5 13 4	16 12 1	18 2 2	63 11 8
6. Bute,	7 7 4	.....	22 3 9	.....	29 11 1
7. Caithness,	12 10 10	9 0 8	10 10 9	6 6 5	38 8 8
8. Clackmannan,	22 14 7	10 7 6	19 4 10	17 9 4	69 16 3
9. Dumbarton,	19 14 6	19 15 9	18 14 0	24 0 0	82 4 3
10. Dumfries,	9 17 9	18 0 4	11 1 10	19 9 0	58 8 11
11. Edinburgh,	182 10 5	181 6 5	166 10 0	130 16 0	661 2 10
12. Elgin,	19 7 9	20 18 6	22 6 5	7 8 6	70 1 2
13. Fife,	68 10 8	64 17 1	51 16 0	49 18 3	235 2 0
14. Forfar,	203 8 0	165 11 5	65 5 10	56 15 1	491 0 4
15. Haddington,	13 14 3	24 13 2	24 0 4	22 1 8	84 9 5
16. Inverness,	19 12 5	30 5 3	40 7 6	21 16 8	112 1 10
17. Kincardine,	24 3 11	0 15 3	15 15 8	8 14 2	49 9 0
18. Kinross,	2 8 8	19 0 4	10 10 11	4 8 9	36 8 8
19. Kirkcudbright,	2 13 1	.....	10 14 1	.....	13 7 2
20. Lanark,	592 3 0	562 19 8	104 11 10	87 2 3	1346 16 9
21. Linlithgow,	19 7 1	23 14 0	40 3 6	28 12 5	111 17 0
22. Nairn,	3 16 4	4 0 0	5 7 11	8 13 4	21 17 7
23. Orkney,	.....	.....	.....	.....	.....
24. Peebles,	.....	.....	.....	.....	.....
25. Perth,	80 7 9	85 16 6	58 15 9	85 4 5	310 4 5
26. Renfrew,	129 2 7	88 16 2	63 6 9	53 4 4	334 9 10
27. Ross & Cromarty,	26 6 2	13 11 6	13 8 4	12 9 5	65 15 5
28. Roxburgh,	7 18 0	.....	8 12 7	.....	16 10 7
29. Selkirk,	5 19 0	4 10 4	22 6 11	4 15 5	37 11 8
30. Stirling,	55 16 2	75 12 7	85 19 9	103 6 10	320 15 4
31. Sutherland,	.....	.....	12 13 6	13 6 0	25 19 6
32. Wigtown,	17 13 9	26 7 8	12 0 3	17 13 5	73 15 1
33. Zetland,	4 18 4	.....	23 5 5	.....	28 3 9
	£1,721 8 0	£1,632 5 0	£1,127 8 10	£959 1 9	£5,440 3 7

ARREARS.

COUNTIES.	PERIODS.	For Prisoners Tried		
		By Jury.	Without Jury.	
Bute,	Half-year to 30th Sept. 1867,	£2 2 8	£16 0 0	18 2 8
Nairn,	Do. Do.	2 7 10	2 16 4	5 4 2
Roxburgh,	Do. Do.	17 9 1	12 15 4	30 4 5
				£5,493 14 10

N.B.—At 31st December 1868 no accounts had been rendered by the following Counties for the periods undernoted:—

COUNTIES.	PERIODS.
Orkney,	For seven half-years ended 30th September 1865, 31st March and 30th September 1866, and 31st March and 30th September 1867, and 30th September 1868.
Bute,	For half-year ended 30th September 1868.
Peebles,	For two half-years ended 31st March and 30th September 1868.
Roxburgh,	For half-year ended 30th September 1868.

No. XXV.

Report on the Dietary Scales given, in the Prisons of Edinburgh and Glasgow respectively, to Male Convicts under Sentence of Penal Servitude.

General Prison, Perth,
19*th October* 1868.

I am instructed in a letter from Dr. Burton, dated 28th July last, to examine the Scales of Dietaries given in the Prisons of Edinburgh and of Glasgow respectively to Male Convicts under Penal Servitude; and I beg to report, for the information of the Prison Managers, the result of my examination. I have also, as requested, discussed the matter with Dr. Christison, and along with him considered the reasons stated on the part of the County Board of Edinburgh for departing from the Dietary sanctioned by the Secretary of State, and have Dr. Christison's concurrence in the conclusions to which I have come in this Report.

I. *Of the Scale of Dietary given to Male Convicts in the Prison of Glasgow.*—Among the documents accompanying Dr. Burton's letter of 28th July last, is a Dietary Table signed by Mr. Stirling, the Governor of the Prison of Glasgow, entitled "Dietary Table V. for adult Male Prisoners under sentence of imprisonment above "six months, which is that supplied to adult Male Convicts, with the additions noted below." From this Table I find that Table V., with some variations, has been substituted for Table VII., which latter is the one prescribed for, and sanctioned for Male Convicts, by the Secretary of State on 1st May 1866. The nutritive values of these two Tables of Dietaries differ very materially, as may be seen by comparing the constituents of their weekly allowances of food:—

	Nitrogenous.	Carboniferous.	Mineral.
No. V. contains in oz., ...	31.5	136.0	5.4
No. VII. contains in oz., ...	34.6	127.0	5.2

This comparison shows the chief difference to be in the nitrogenous principles, 3.1 oz. being in favour of No. VII. Looking at the articles of food supplied, I find that 28 oz. of meat are weekly given in the authorized scale of dietary; but no meat, except what is contained in the soups and broths, is found in the dietary scale No. V., as substituted in the Prison of Glasgow. From previous inquiries into this subject, the best authorities regard it as a settled point, that for long-sentenced Prisoners a considerable portion of the dietary should be composed of nitrogenous principles, amounting to at least one-fourth part of the diet, in order to maintain good health under hard labour, and the depression of mind especially incident to convict life. This most alimentary part, butchers' meat, being wanting in Table V., I consider it defective in its nutritive character.

My opinion of the inadequate character of the Glasgow Prison Dietary Scale in question is confirmed by the fact, that under its use there have been marked indications of a low physical condition generally, and not a few cases of positive disease, of a scrofulous nature, among the Male Convicts admitted into the General Prison for Scotland from the Prison of Glasgow. The number of male Convicts admitted here from the Glasgow Prison during 18 months (viz., from 1st January 1867 to 30th June 1868), amounted to 45 in all; and while many of them did not seem in good physical condition, the following cases of scrofula were among them:—

Case 1. William Dalby aged 26, under a sentence of 5 years' penal servitude was admitted, from the Prison of Glasgow, on 12th January 1867, to the General Prison at Perth, with incipient scrofula affecting the glands of the neck, which he states to have been first noticed by him in the prison of Glasgow, where he had been detained 2 months and 12 days.

Case 2. James Colhoun, aged 22, a Convict under a sentence of 8 years' penal servitude, was admitted here from the Prison of Glasgow on 20th June 1867, where he had been for 7 months before. On admission he showed extensive scrofulous swellings of the neck, which went on to suppuration in spite of generous diet and cod liver oil. He says this scrofulous malady was never seen in him or in his family, to his knowledge, until he was confined in Glasgow Prison. The Prisoner became unfit for public works by reason of his invalided state.

Case 3. John Docherty, aged 18, a Convict under a sentence of 8 years' penal servitude, was admitted to the General Prison from the Prison of Glasgow on 7th November 1867, with incipient scrofulous swellings of neck, which he admitted having had formerly, but which re-appeared in Glasgow Prison, where he had been confined latterly 4 months and 12 days.

Case 4. John Harris, aged 25, a Convict under a sentence of 10 years' penal servitude, was admitted on 25th January 1868 to the General Prison with scrofulous swellings on the right side of the neck, which did not suppurate but subsided. His statement is that the scrofulous swellings began in Glasgow Prison, and were unknown in his family till then. He had been detained in Glasgow Prison for 2 months and 5 days. Generous diet and cod liver oil arrested the progress of scrofula here.

Case 5. Robert Barclay, aged 38, a Convict under a sentence of 8 years' penal servitude, was admitted with scrofulous tumours on the right side of the neck. He came to the General Prison on the same day with No. 4. He says the glandular swellings began in Glasgow Prison, and were hitherto unknown in his family. He had been 3 months and 20 days in Glasgow Prison. Generous diet and cod liver oil arrested the disease here, and improved his general health.

Perhaps it would be too much to say that these cases were all or solely due to the Prison dietary, but occurring as they did under the substituted dietary at Glasgow, this was probably the chief cause. The Tables of Dietary sanctioned by the Secretary of State were purposely adjusted with the view of preventing scrofula and other prison diseases, which had been traced to defective alimentation; and under an improved Scale of Dietaries scrofula had become extremely rare. These cases from Glasgow are all the more likely to have been caused by the substituted dietary introduced there, seeing that in the General Prison at Perth where all Male Convicts pass a probationary period before being transmitted to public works, I have not been able to trace a single case

of scrofula generated under the authorized Scale of Dietary for Male Convicts. With these views of the defective alimentary character of the substituted dietary in Glasgow Prison, and the apparent results in engendering scrofulous disease, I am of opinion that it would be injudicious to sanction the Scale of Dietary in question for Male Convicts. (No. XXV. *Continued.*)

II. *Of the Scale of Dietary given to Male Convicts in the Prison of Edinburgh.*—A document has been placed in my hands, signed by the Governor of the Edinburgh Prison, Mr. Smith, which shows that Table V. was the Dietary Table for Male Convicts, with the supplementary allowance of 6 oz. wheaten bread and half of an imperial pint of sweet milk daily. These additions increase the quality as well as the quantity of the dietary—the quantity being already sufficient; but as in the case of Glasgow Prison, the quality I think defective. These additions do not make the Dietary Scale so valuable as No. VII., which is that sanctioned by the Secretary of State for Male Convicts. The substituted dietary is defective in meat, an article which, in all authorized scales for Male Convicts, in England as well as Scotland, is met with, and has been proved to be essential. I have estimated the costs weekly of No. V. and No. VII. dietaries, and find the expense of the latter, by having meat, exceeds the former by nearly 1s. a week. But my observations on a large scale have satisfied me, that the reduced rate of sickness and deaths, the consequently increased amount of work got from Prisoners, and the savings in medical comforts would render the Dietary Scale No. VII. containing meat, in the end, the most economic. Among 56 Male Convicts admitted here from the Prison of Edinburgh during the 18 months, viz., from 1st January 1867 to 30th June 1868, several were observed to be in rather poor condition, and at least two to be scrofulous.

Case 1.—John Banks, aged 20, a Convict under a sentence of ten years' penal servitude, was admitted to the General Prison on the 4th June 1867, with glandular swellings of a scrofulous nature in the neck, which, he says, began in the Edinburgh Prison, and never appeared before in him or any of his family. He had been in Edinburgh Prison 6 months and 18 days.

Case 2.—Richard Cameron, aged 19, a Convict under a sentence of eight years' penal servitude, was admitted here on the 28th February 1868, with scrofulous swellings on the neck. He says, that when nine years old he had the same, but got better, and these swellings only re-appeared under his recent confinement in Edinburgh, where he had been detained 2 months and 11 days.

I am not prepared to state strongly that these cases had their chief cause in the dietary of the Edinburgh Prison, but I quote them to prove the degenerate state of this class of prisoners, and how important it is to adopt a sufficient, perhaps in the case of Male Convicts a surplus, dietary to check the tendency to deterioration. Upon the whole, although the Male Convicts from the Prison of Edinburgh have stood up better than those from the Prison of Glasgow, probably because of their additions making the dietary scale better (and probably from other local Hygienic influences), I am of opinion that the Scale of Dietary being without meat, except in the soups and broths, is not such as can be safely sanctioned for Male Convicts.

III. *Of Letter dated 18th July* 1868, *from the Prison Board of Edinburgh to the Secretary of State, transmitting the Scale of Dietary, with reasons for adopting it.*—Along with Dr. Christison, I have considered this letter and the reasons therein set forth, on the part of the County Board of Edinburgh, for departing from the Dietary Scale sanctioned by the Secretary of State. The chief reason is contained in the following passage:—"The distinctive character of the diet (in Rule No. VII.) and its probable effect on the minds of the other "classes of Prisoners on finding themselves treated, in respect of diet, less favourably than those whose offences "are of a more aggravated character." If this objection is tenable against No. VII. of the sanctioned Dietary Rules, it is equally valid against all dietary distinctions—the prescribed Rules containing no less than eight distinctive varieties, adapted to as many *different classes* of Prisoners, and as dietaries have never been held in Scotland to be of a punitive character, they have been suited to the length of confinement and the amount of hard labour of Prisoners. If, however, the dietary prescribed for Male Convicts is found inexpedient in Local Prisons, of which their is no evidence, then the suggestion of the Edinburgh County Board appears proper enough, viz.:—that Male Convicts, after conviction, be at once transmitted to a Government Prison. The fact that scrofula has not recently been seen originating in the General Prison at Perth affords a good argument for this course being followed. In my last annual Report I have noted a number of cases of scrofula which have transpired in Local Prisons, proving that long detention becomes injurious in these Local Prisons. At all events, the objection taken to distinctive dietaries has no weight in my mind against No. VII. Dietary Scale. The question of how far *Male Convicts can be safely placed upon a low rate of diet in the early stages of their confinement* is not a new one, and has, from its importance, been frequently made matter of special investigation. In a joint report by Dr. Christison and myself on the Prison Dietaries of Scotland, we say, "we have considered "a matter which has engaged the attention of the Committee on English Dietaries, *how far it is safe to put "Convicts upon a low rate of diet in the early stages of confinement*, graduating the Dietary Scale. We hold "that hard labour, and the depression of mind of Convicts, do not admit of low dietary rates, and if there is a "failure of health and strength in the early months of imprisonment, it is difficult and expensive to restore this class of Prisoners to vigour for work." Whatever value there may be, therefore, in the argument against distinctive dietaries being carried out in the Prison of Edinburgh, the reason seems inadequate for setting aside No. VII. scale for Male Convicts.

The Edinburgh letter goes on to state further:—"It seems to the Board to be hardly conceivable that the "continuance, for so short a time as Convicts usually are, or ought to be, detained in County Prisons subsequent "to conviction, of a diet considered to be sufficient for so much more protracted a period of imprisonment, can "be the producing cause of the alleged deterioration in which Convicts are when received into the General "Prison."

No. V. is prescribed for adult Males under sentences of imprisonment exceeding six months, whether with or without hard labour. But the statement above quoted ignores the fact that Male Convicts enter upon their confinement with much more deteriorated constitutions than ordinary Prisoners; they have gone through a longer course of crime, suffered more frequent confinements, and the Scale of Dietary fitted for shorter sentenced Prisoners was not found sufficient for them. The results of the present inquiry give only further proof of the necessity of distinctive dietaries. We ought also to remember, that the abolition of transportation threw back upon Prisons here the most deteriorated of the criminal classes—Male Convicts sent to penal servitude. In 1859 I made a tour through the Government and County Prisons of England, and in some of these I found loathesome forms of scrofula, such as were known in Scottish Prisons some years ago, but have disappeared since a better Scale of Dietaries was adopted. All medical officers in England and Scotland unite in testifying that scrofula, scurvy, etc., are extremely liable to attack Prisoners, and can only be prevented by liberal dietaries, especially

(No. XXV. *Continued.*) those subjected to Convict life. All the advanced Convicts whom I have seen, appear generally exhausted and worn out, in spite even of liberal diet, and all the ameliorations of Prison discipline, moral and medical, employed in their behalf.

Allow me to recapitulate briefly the conclusions involved in the foregoing inquiries, viz. :—

1. That the Scale of Dietary substituted in Glasgow Prison for that sanctioned by the Secretary of State, appears to be inadequate in its alimentation, and has been attended by several severe cases of disease of a scrofulous nature.

2. That the Scale of Dietary substituted in the Edinburgh Prison, although in a less degree than that of Glasgow, has been followed by a somewhat reduced physical condition of the Male Convicts in some cases of disease; and looking at its defect in the article of Meat, in my opinion, would prove unsatisfactory for Male Convicts.

3. That the reasons offered by the County Board of Edinburgh Prison do not, in the opinion of Dr. Christison and myself, justify a departure from the Scale of Dietary, No. VII. of the Dietary Rules, sanctioned by Sir George Grey on 1st May 1866, for Male Convicts.

J. B. THOMSON, L.R.C.S. Edin.,
Resident Surgeon, General Prison for Scotland.

No. XXVI.

REGULATIONS for the REMOVAL of PRISONERS, passed in terms of "The Prisons (Scotland) Administration Act, 1860," 23 and 24 Vict. c. 105; and of the Act 31 and 32 Vict. c. 95, "To Amend the Procedure in the Court of Justiciary, and other Criminal Courts in Scotland."

N.B.—*Though for convenience the Masculine gender is chiefly used, the Rules are to apply to Females.*

I.—*General.*

1. Subject to any special Instructions which he may receive, the Governor of the Prison to whom Directions for a removal are transmitted, shall proceed by instructing the proper number of Escort-Officers (being discipline Officers of the Prison, or Officers of the Law) to execute the same without delay. When the Governor of a Local Prison cannot procure a sufficient escort, he is immediately to intimate the case to the Managers, in order that they may effect the removal through Officers of the General Prison.

2. The Governors and Surgeons of Prisons shall take care that no Prisoner be removed, unless the state of the Prisoner's health be such as to admit of the removal being carried out with safety. To this end, if the Surgeon of the Prison certify under his hand that, owing to the Prisoner's state of health, the removal cannot be effected with safety, the removal shall be deferred until it can be effected with safety. When an Officer of the General Prison is intrusted with Directions for a removal from a Local Prison, it will be the duty of the Governor of such Local Prison to refuse to part with the Prisoner if he be so certified as unfit for removal. The Officer in charge of Directions to remove a Prisoner so detained on account of bad health, shall, within twenty-four hours, intimate the occurrence to the Managers. It is competent to the Managers, in any case where the removal of a sick Prisoner becomes necessary, to authorize a Medical Practitioner to attend the Convoy, with the usual allowances of his class, provided it be certified on soul and conscience by two medical practitioners that such attendance is necessary for the Prisoner's safety.

3. In the removal of every female Prisoner at least one female Officer shall accompany her during the whole course of her journey.

4. Each Prisoner shall, before removal, be thoroughly protected, by suitable clothing, against the weather during the journey.

N.B.—In carrying out this Regulation on long journeys, it is desirable that each male Prisoner should be provided with a bed-rug, and also, in winter, with a flannel shirt and drawers, if they are without such of their own; —and each female should be provided with a bed-rug, and also, in winter, with bonnet, two flannel petticoats, gown, stockings, and shoes, if they are without such articles of their own. When not sufficiently clothed otherwise, it will be proper that Prisoners be supplied with the necessary requisites to the full extent. All articles so supplied for the journey, should, after delivery of the Prisoners, be enclosed in a sheet with straps provided for the purpose, and brought back by the Officers in charge.

5. The allowances to Officers and others are to be charged according to the annexed scale (Schedule C). An Officer employed for however short a period, is entitled to charge for one day, or one night, as the case may be; but in charging for longer journeys, the Managers will judge, from the circumstances, how many of such periods have been necessarily occupied in the service. The Governor of a Prison is not to be entitled to the Governor's allowance unless he has gone in charge of the convoy by the *special* authority or with the approval of the Managers.

6. When the service is not executed by Officers of the General Prison, it is desirable that the account of the expenses be forwarded to the Managers without delay. In such Accounts each item shall be duly dated and distinctly specified, and the rate of coach, steamboat, or railway fair for each person stated. Each Account shall be framed according to the Form approved of by the Managers, and shall be certified as examined and found correct by the Governor of the Prison. Blank copies of the Form may, on application, be obtained from the Managers; and no claim can be attended to unless made out according to that Form.

II.—*Special as to Prisoners sentenced to Periods of Imprisonment.*

7. Every Prisoner under a sentence of nine months and upwards shall be removed to the General Prison as soon as possible after the passing of the sentence, unless it contain a clause declaring that he shall not be so removed. In each instance the Directions for carrying such removal into effect shall be certified under the hand of one of the Managers in the Form appended hereto (Schedule A); and the Directions so certified shall be a sufficient authority to the person in possession of the same to execute the removal.

8. Along with each Prisoner conveyed to the General Prison, there shall be transmitted, 1*st*, The warrant whereupon the Prisoner is imprisoned, or, when necessary, other regular extract of the sentence. 2*dly*, A full extract as to each Prisoner from the Register of Criminal Prisoners, according to the Form of Schedule, entitled "Extract from the Register of Criminal Prisoners." 3*dly*, Any articles of property belonging to such Prisoner, with an inventory thereof in duplicate,—one copy whereof to be left, with the articles, in charge of the Governor of the General Prison, and the other to be returned to the County Board, with the receipt of the Governor or one of his Officers thereon. 4*thly*, A certificate by the Surgeon of the Prison from which the Prisoner is removed, as at the date of the removal,—to be submitted, on the Prisoner's admission into the General Prison, to the Surgeon thereof, for his assent or dissent, and to be afterwards deposited with the Governor of that Prison.

III.—*Special as to Convicts sentenced to Transportation or to Penal Servitude, removed by Secretary of State's Warrants.*

9. As it is very desirable, both for economy and security, in the accomplishment of removals to the convict establishments in England, that the Convicts should be assembled in groups, and that the railway convict car should be employed, as far as practicable, for their conveyance, special instructions, for the purpose of accomplishing this object, will be issued by the Managers to accompany each warrant. These instructions must be obeyed; but if any accident should defeat the arrangement, it will be the duty of the Officer in charge to convey his Prisoner or Prisoners by the quickest, safest, and most economical route, in terms of the warrant.

10. In carrying out the directions in the warrant of the Secretary of State requiring the Governor to deliver with the convict a true copy, attested by him, of the caption and order of Court by which such Offender is sentenced or ordered for Transportation or Penal Servitude, containing the sentence or order of Transportation or Penal Servitude of each, the Governor shall, in each case, make, or cause to be made, a true copy of the caption and order, and he shall doquet and attest the same in the following terms:—"I, Governor of the Prison of , hereby attest and certify that the foregoing is a true copy of the caption and order of Court containing the sentence by virtue of which the before named convict is in my custody;" and the copy, with such attestation signed by him, shall be delivered along with the Convict.

11. When Convicts are brought from one or more Prisons to another Prison, to be thence removed in a body, the Prison to which they are to be so brought shall, for the special purpose of the service, be called "The Station Prison," as distinguishing it from the others.

12. The Escort-Officer who brings a convict to a Station Prison, shall deliver the Convict with the necessary papers to the Governor, who shall in return give him, as his discharge, a receipt in the following terms:—

"I, Governor of the Prison of have this day of 186 , received from the custody of the Governor of the Prison of the bodies of the Convicts named on the margin hereof, and also on the margin of the order issued by the Secretary of State for the Home Department, of date the day of and *en route* for ."

13. The Governor of the Station Prison shall immediately, on his convoy being completed, cause to be removed all the Convicts so assembled, whether they have been confined originally in the Station Prison, or have been brought from other Prisons.

14. When no Officer has been appointed by the Managers to the special charge of the convoy, the Governor of the Prison whence any Convicts are removed, is to name the Officer in charge. On reaching a Station Prison, the Governor of that Prison shall name the Officer to continue in charge. If there be a further assembling at another Station Prison, the Governor of that Prison shall name the Officer who is to continue in charge; and so on.

15. Prior to the removal, the Governor of the Prison (if convicts are grouped, the Governor of the Station Prison), shall despatch to the Railway Station-master or Steam-packet Company, as the case may be, to the Secretary of the Prison Managers in Edinburgh, and, in the case of removals to England, to the Secretary of the Directors of Convict Prisons in London, a notice, properly filled up, in the following form:—

"There will be removed on , at o'clock, by the Railway, from their station at , [or by the Steam-packet from the Pier at as the case may be] Convicts and Officers *en route* to the . It is expected that the train (or Steam-packet) will arrive at , (or wharf) on at o'clock ."

16. Besides such documents as the Secretary of State may, in terms of his warrant, require to be transmitted along with Convicts, each Convict removed to the General Prison must be accompanied by a surgeon's certificate in the same form as that appointed for other Prisoners by Article 8 of these Regulations.

17. The number of days (including nights) in the following Table (which applies to Justiciary Court towns), will be allowed to Officers for the journeys to which they refer. Other journeys will be considered according to the special circumstances.

From	To Wakefield and back. Days.	To London and back. Days.
Aberdeen, Inverness, and Inverary,	4	5
Edinburgh, Glasgow, Perth, Dundee, Ayr, Dumfries, and Jedburgh,	3	4

(No. XXVI. *Continued.*)

IV.—*Special as to Prisoners under the Court of Justiciary Act* (31 *and* 32 *Vict. c.* 95).

18. In each instance the Directions for carrying such Removal into effect shall be certified under the hand of one of the Managers, in the form appended hereto (Schedule B); and the Directions so certified shall be sufficient authority to the person in possession of the same to execute the removal, in terms of the Warrant of the Court.

19. Such Directions may be transmitted, either to the Governor of the General Prison at Perth, or to the Governor of the Prison from which the Prisoner to whom the Directions apply is to be Removed, and the Governor who receives such Directions is responsible for the execution thereof.

T. G. MURRAY.
J. H. BURTON.

SCHEDULE A.—FORM OF DIRECTIONS FOR REMOVAL.

To the Governor of

Directions for Removal of

From the Prison of

to the General Prison at Perth.

WHEREAS by the Prisons (Scotland) Administration Act, 1860, it is enacted, "That from and after the commencement of this Act, when a Sentence is pronounced by any Court of competent jurisdiction, adjudging any person to imprisonment for a period of nine months or upwards, such Sentence, whether the General Prison at Perth be mentioned therein or not, or whether the name of any other Prison be mentioned therein or not, shall be deemed to be, and is hereby declared to be, a Sentence which may be carried into effect in the said General Prison, unless such Sentence contains a clause especially declaring that the Prisoner shall not be removed to said General Prison; and any person undergoing a Sentence which may be so carried into effect in the General Prison, may be removed thereto at any time, in terms of the provisions of this Act for the removal of Prisoners." And whereas by the said Act it is further enacted, that, except in the case of Removals by County Boards to Local Prisons, "All removals of Prisoners from one Prison in Scotland to another Prison in Scotland, and all removals of Convicts sentenced to Transportation or to Penal Servitude from any Prison in Scotland to any one of her Majesty's Prisons or Penitentiaries in England, in virtue of Warrants granted by one of Her Majesty's Principal Secretaries of State, under the provisions of the Statutes to that effect, shall be carried out by, or under the direction of, the Managers who may issue Regulations or Instructions for carrying out such Removals."

AND WHEREAS in a Return made to the Managers, in terms of the said Act, by it is stated that on the day of in the year the Prisoner aforenamed, sentenced by the as follows, viz:—

In terms of the "Regulations for the Removal of Prisoners," you are hereby directed forthwith to remove the said Prisoner from the Prison of in the County of to the General Prison at Perth, along with the Warrant upon which confined, or where necessary, other regular Extract of the Sentence.

Edinburgh, the day of .

SCHEDULE B.—FORM OF DIRECTIONS FOR REMOVAL UNDER COURT OF JUSTICIARY ACT.

To the Governor of

Directions for Removal of

From the Prison of

To the Prison of

WHEREAS, by an Act passed in the Thirty-First and Thirty-Second Years of Her Majesty's Reign (Chap. 95) entituled, "An Act to Amend the Procedure in the Court of Justiciary, and other Criminal Courts in Scotland," it is enacted "that it shall be competent for the Managers of the General Prison at Perth, appointed by or

under the authority of 'The Prisons Scotland Administration Act, 1860,' and they are hereby required to make Regulations as to the mode in which, and the Officers by whom, such Warrants shall be executed." (No. XXVI. *Continued.*)

And Whereas, at the instance of Her Majesty's Advocate, the High Court of Justiciary did, on the day of , in the year grant Warrant for the removal from the Prison of to the Prison of of the Prisoner named as follows, viz.:—

which Warrant is herewith transmitted as relative hereto.

In terms of "The Regulations for the Removal of Prisoners," you are hereby directed forthwith to remove the said Prisoner from the Prison of in the County of to the Prison of along with the Warrant upon which confined, or, where necessary, other regular Extract of the Sentence.

Edinburgh, the day of

SCHEDULE C.—TABLE OF ALLOWANCES.

I.—TO ESCORT OFFICERS.

Personal Allowances.	Day.	Night.	Railway Allowances.
1. Governor, ... (When travelling with written instructions from the Managers to take charge of the Escort).	10/	5/	First Class.
2. Officer (other than Governor) in charge of Convoy to England, ...	7/	5/	To be in the Carriage with Convoy—Second Class returning; First Class only when there is no Second in the Train.
3. Officer in charge of Convoy not leaving Scotland, and Officer of the Law employed when Prison Officer is not available,	5/	3/	To be in Carriage with Convoy—Second Class returning, and Third if there is no Second in the Train.
4. Warders, ...	4/	2/	

II.—OTHER ALLOWANCES.

To the Certifying Surgeon for Examination and Certificate, as formerly, viz.:—
When there is one Convict, ... 21/
When there are more than one, ... 42/
To the Governor for furnishing each attested copy of Caption and order of Court, . . . 5/
To each Police Officer necessarily employed at Railway Stations or Steam Wharfs in assisting escort Convicts, according to distance and time occupied, from 1/6 to . . . 2/6
To Artisans necessarily employed in rivetting Irons on Convicts—
Above 10 in number, ... 10/
Not above 10, each Convict, ... 1/

THIRTIETH REPORT

ON

PRISONS IN SCOTLAND:

BEING

(IN CONTINUATION OF THE REPORTS OF THE LATE GENERAL BOARD OF PRISONS)

THE EIGHTH ANNUAL REPORT

OF

THE MANAGERS APPOINTED UNDER THE PRISONS (SCOTLAND) ADMINISTRATION ACT.

TO THE RIGHT HONOURABLE HENRY AUSTIN BRUCE,

ONE OF HER MAJESTY'S PRINCIPAL SECRETARIES OF STATE.

Presented to both Houses of Parliament by Command of Her Majesty.

EDINBURGH:
PRINTED FOR HER MAJESTY'S STATIONERY OFFICE,
BY THOMAS CONSTABLE.

1869.

CONVICT DISCIPLINE (WESTERN AUSTRALIA AND TASMANIA).

ANNUAL REPORTS ON THE CONVICT ESTABLISHMENTS

AT

WESTERN AUSTRALIA

AND

TASMANIA.

Presented to both Houses of Parliament by Command of Her Majesty, 1869.

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PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
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FOR HER MAJESTY'S STATIONERY OFFICE.

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[Price 4d.]

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SCHEDULE.

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ANNUAL REPORTS ON THE CONVICT ESTABLISHMENTS

AT

WESTERN AUSTRALIA AND TASMANIA.

WESTERN AUSTRALIA.

No. 1.

COPY of a DESPATCH from Acting Governor BRUCE to the Right Honourable the Earl GRANVILLE, K.G.

(No. 46.)

MY LORD, Government House, Perth, February 26, 1869.

I HAVE the honour to forward to your Lordship the annual Report of the Comptroller-General of Convicts, for the period ending the 31st December 1868.

2. I regard this Report as satisfactory, and I take the present opportunity of expressing my high appreciation of the activity, zeal, and good judgment of Mr. Wakeford in relation to his important duties.

I have, &c.
(Signed) J. BRUCE,
Acting-Governor.

The Right Honourable the Earl Granville, K.G.
&c. &c. &c.

Enclosure in No. 1.

Sir, Comptroller-General's Office, Perth, February 24, 1869.

I have the honour to submit, for transmission to Her Majesty's Secretary of State for the Colonies, my report on the Convict Department in Western Australia for the year 1868.

I enclose statistical returns numbered from 1 to 12 upon which I may make a few detailed remarks.

Return No. 1 gives a total number of Convicts in the Colony on the 31st December 1868 of 3,158, the number at the end of 1867 having been 3,220, thus showing a decrease in the year of 62.

By return No. 2 it appears that the number of men maintained by the Imperial Government had in the same period dimished by 128.

Return No. 3 shows that only one Convict ship, the "Hougoumont," arrived in the year (on the 10th January) bringing 279 Convicts, being the last intended consignment to Western Australia of that class of immigrants.

The number of Convicts employed on public works had diminished during the year by 157, as stated by Return No. 4.

The distribution of those Convicts throughout the Colony is given in detail in Return No. 5.

Western Australia.

The number of ticket-of-leave holders maintaining themselves was greater by 42 at the end of 1868 than at the end of the previous year, while the number on the hands of the Government was rather less.

The number of conditional releases issued in 1868 was less (45 to 53) and the number revoked more (6 to 3) than in the preceding year.

The rule that conditional releases are granted to none but men whose conduct has been uniformly good for the regulated period to be served by them as holders of tickets-of-leave, has been rigidly enforced, and inasmuch as the conviction of the holder of a conditional release for any offence is made *ipso facto* the ground of forfeiture of his special privileges, the 85 men, who at the close of the year retained those privileges, may be regarded as having conducted themselves in an exemplary manner.

By Return No. 8 it will be seen that 16 expirees and holders of conditional pardons were relegated to the Convict Class in 1868 as compared with 23 in 1867.

Although the total number of offences committed by men employed on public works (Return No. 9) was larger during 1868 than in 1867 by 63, yet it must be borne in mind that during the early months of 1868 the number of such Convicts was much larger than in any previous year.

The number of offences committed by ticket-of-leave holders, as exhibited in Return No. 10, was larger in 1868 than in 1867 by 109.

Return No. 11 shows a decrease of 15 in the number of deaths of Convicts in 1868 as compared with the number in 1867.

I append a Return (No. 12) exhibiting a statement of the expenditure in the Colony on account of the Convict Service during the year ended the 31st March 1868.

The conduct of the Convicts on the hands of the Government may be said to have been not unsatisfactory considering that the proportion borne by the number of those who have been frequently convicted in the Colony, to the number not so convicted, has been materially altered by the increase of the former class and the decrease of the latter, nevertheless the infrequency of crimes of violence both among prisoners and ticket-of-leave holders affords ground for congratulation. There has not in the past year been an instance in which a Convict of any class has either undergone the extreme penalty of the law or been tried for a capital offence.

The number of escapes or attempts to escape on the part of Convicts (Return No. 9) in 1868 was 25 in excess of the number in 1867, and of these offences, I may repeat the statement I made in my report for the year 1867, that a very small fraction represents cases in which the men hoped finally to escape either from the Colony or from the restraints attending their condition as prisoners.

Few instances occurred in which absconded Convicts while illegally at large committed robberies, and none in which acts of violence were superadded. These facts doubtless resulted in part from the activity and vigilance of the police, and in part from the willing assistance given to absconders by men of the Convict class. Cases too have not been wanting in which absconders have been discovered after a lapse of some time apparently earning an honest livelihood in the service of respectable settlers to whom their true condition was unknown.

The number of assaults upon officers has increased, but it is satisfactory to me to state that in no instance was the assault of such a violent nature as to result in serious or permanent injury to the officer assaulted.

In other respects the details of the offences committed by prisoners in 1868 will compare favourably with those of 1867, and especially so under the head of "conduct," the number of cases of "highly insubordinate conduct" (92) in 1868 being less by 43 than in 1867.

I think it right however to state that I entertain a strong opinion as to the necessity of keeping up the efficiency of the staff of disciplinary officers. A very large proportion of the Convicts now stationed at Fremantle consists of men of dangerous and reckless character whom it is difficult to control and scarcely possible to amend. This class forms the nucleus of the residuum of Convicts whose career forbids any sanguine hope of their ultimate reclamation. No efforts are spared to induce such men to regain their liberty by good conduct or as the reward of useful service which they have not infrequent opportunities of rendering.

With reference to the Convicts under sentence for treason felony and crimes of a like nature, the greater portion of them during the year conducted themselves well, and I had hopes that they would continue to be amenable to the very moderate discipline imposed upon them. Towards the close of the year however some of them displayed a spirit of restlessness and impatience of authority, and were, apparently, chafing under the mild restraints to which they were subject.

The disciplinary punishments inflicted upon Convicts during the year have consisted of a bread and water diet for various periods, not exceeding in extreme cases 28 days, of lashes in rare cases such as assaults upon officers, and of separate confinement for moderate terms in cases in which seclusion was expected to have a salutary effect.

Of the offences committed by ticket-of-leave holders the increased number in 1868 in comparison with that in 1867 is chiefly to be found under the head of drunkenness, which in Western Australia as elsewhere is lamentably the fruitful and unfailing source of crime.

The cases of absconding consist of breaches of the regulation by which the holder of a ticket-of-leave is restricted to the district assigned to him for his residence, and the increase in the number of men convicted of this offence may be ascribed to the fact that facilities for concealment are afforded by the large number of men of the Convict class scattered through the Colony whose sympathies would lead them to harbour such offenders.

During the year 1868 a system was adopted under the local law of revoking the tickets-of-leave of men convicted by the magistrates of any but trivial offences or who had been the subject of many, though perhaps not serious, summary convictions. In such cases the effect of the revocation of the ticket-of-leave is to deprive the subject of it of all claim to release during the currency of his sentence. Before the indulgence of a ticket-of-leave is again granted, each case is carefully weighed with regard both to the nature and frequency of the offences committed. It is hoped that the good effect of this mode of dealing with such cases will become apparent in the diminution of offences.

I am able to report favourably of the general health of the Convicts throughout the Colony during the year, having regard to the fact that many of them have led lives of irregularity and vice. In the early part of 1868 the prisons at Perth and Fremantle were less healthy than in former years during the corresponding portion of the summer season, arising I doubt not to some extent from the drainage being carried into cesspools wherein the seeds of disease were stored up. The use of dry earth, which has been adopted in those prisons and at some of the depôts, has hitherto proved highly successful. I have taken much interest in this mode of improving the sanitary condition of the various stations, and have arranged for its application in the depôts in which it was not used last year.

The majority of the officers of the service have performed their duties in an efficient manner, and I can again report with satisfaction the good conduct of most of those warders who have been placed in charge of detached working parties of Convicts at a distance from support of any kind and without even the semblance of physical force to aid them in preserving discipline and order and in enforcing industry among the men.

I enclose the reports of the Surgeon of Fremantle Prison and of the Surgeon-Superintendent of the Lunatic Asylum, and statements of the various works performed by Convict labour throughout the Colony.

I have, &c.
HENRY WAKEFORD,
Comptroller-General.

His Excellency the Governor,
&c. &c. &c.

No. 1.

RETURN of the Number of Convicts in Western Australia on the 31st December 1868.

On the Public Works.			Invalids and Hospital.			Lunatic Asylum.	Ticket-of-Leave Holders in Private Service.	Conditional-Release Holders.	Grand Total.
Probation and Re-convicted Ticket-of-LeaveHolders.	Ticket-of-Leave Holders out of Employment.	Total.	Probation and Re-convicted Ticket-of-LeaveHolders.	Ticket-of-LeaveHolders.	Total.				
1,519	31	1,550	51	38	89	25	1,409	85	3,158

Comptroller-General's Office, Perth,
24th February 1869.

HENRY WAKEFORD, Comptroller-General.

WESTERN AUSTRALIA.

No. 2.

NUMBER of Men maintained by the Imperial Government on the 31st December 1868.

On the Public Works.		Hospital and Invalids.			Lunatic Asylum.			Total.
Probation and Re-convicted.	Ticket-of-Leave Holders out of Employment.	Probation and Re-convicted.	Ticket-of-Leave Holders.	Conditional-Pardon and Expirees.	Probation and Re-convicted.	Ticket-of-Leave Holders.	Conditional-Pardon and Expirees.	
1,519	31	51	38	18	22	3	8	1,690

Comptroller-General's Office, Perth,
24th February 1869.

HENRY WAKEFORD, Comptroller-General.

No. 3.

RETURN of the Number of Convicts that have arrived in the Colony from England during the Year 1868.

Ship.	Date of Arrival.	No. by Assignment List.	Deaths on Passage.	No. landed.
"Hougoumont" -	10th January 1868 -	280	1	279

Comptroller-General's Office, Perth,
24th February 1869.

HENRY WAKEFORD, Comptroller-General.

No. 4.

COMPARATIVE Return of the Number of Convicts employed on Public Works on the 31st December 1867 and 1868 respectively.

Years.	Probation and Re-convicted Ticket-of-Leave Holders.	Ticket-of-Leave Holders out of Employment.	Total.	Remarks.
1867	1,657	50	1,707	
1868	1,519	31	1,550	

Comptroller-General's Office, Perth,
24th February 1869.

HENRY WAKEFORD, Comptroller-General.

No. 5.

DISTRIBUTION of Men on Public Works throughout the several Districts on the 31st December 1868.

District.	No. of Men.
Fremantle - - - - -	556
Murray - - - - -	35
Perth - - - - - -	248
Plantagenet - - - - -	167
Sussex - - - - - -	44
Swan - - - - -	208
Toodyay - - - - -	65
Victoria - - - - -	109
Wellington - - - - -	111
York - - - - - -	96
Total - - - -	1,639*

* Including 51 probation and re-convicted men, and 38 ticket-of-leave holders in hospital, which leaves a balance of 1,550.

Comptroller-General's Office, Perth,
24th February 1869.

HENRY WAKEFORD, Comptroller-General.

No. 6.

COMPARATIVE Return of Ticket-of-Leave Holders for the Years 1867 and 1868.

Years.	No. earning their own Livelihood, 31st December.	No. on the Hands of Government.			No. of Magisterial Sentences including Fines.
		No. maintained on 31st December.	Greatest Number.	Smallest Number.	
1867	1,367	77	124	77	1,132
1868	1,409	72	142	67	1,241

Comptroller-General's Office, Perth, 24th February 1869.

HENRY WAKEFORD, Comptroller-General.

No. 7.

RETURN of the Number of Conditional Releases for the Year 1868.

No. issued.	No. revoked.	Total No. held on 31st December.
45	6	85

Comptroller-General's Office, Perth, 24th February 1869.

HENRY WAKEFORD, Comptroller-General.

No. 8.

RETURN of the Number of Conditional-Pardon Holders and Expirees received under fresh Sentences during the Year 1868.

Class.	No.
Conditional-pardon holders	3
Expirees	13
Total	16

Comptroller-General's Office, Perth, 24th February 1869.

HENRY WAKEFORD, Comptroller-General.

No. 9.

DESCRIPTION of Offences by Men on Public Works.

Offences.	No. of each.
Assaulting Officers (including Police)	15
Conduct 1. Highly insubordinate	92
2. Insolence or disobedience	260
3. Disrespectful or disorderly	20
Striking or quarrelling with other prisoners	92
Idleness or refusal to work	395
Malingering	78
Escapes or attempts to escape	185
Possession of prohibited articles	146
Theft	68
Destroying or making away with prison property	101
Drunkenness	111
Miscellaneous	421
Total	1,984

Comptroller-General's Office, Perth, 24th February 1869.

HENRY WAKEFORD, Comptroller-General.

WESTERN AUSTRALIA.

No. 10.

RETURN of Offences for which Ticket-of-Leave Holders have been convicted by Magistrates during the Year 1868.

Offences.	No. of each.
Absconding	71
Assault, common	34
Burglary	7
Drunkenness	488
Felony	55
Forgery	4
Larceny	62
Assault with intent to commit rape	1
Unnatural crime	1
Wounding with intent	4
Miscellaneous	514
Total	1,241

Comptroller-General's Office, Perth,
24th February 1869.

HENRY WAKEFORD,
Comptroller-General.

No. 11.

RETURN of Deaths for the Year ended 31st December 1868.

Reg. No.	Name.	Ship.	Status.	Cause of Death.	Date of Death.
9225	Lawson, Robert	"Corona"	P.P.	Paralysis	10th January 1868.
6275	Davidson, Thomas	"Norwood"	T.L.	Gun shot wound	10th January 1868.
8403	Swindells, John	"Racehorse"	P.P.	Heart disease	18th January 1868.
7972	Dickenson, John	"Merchantman" 2nd	T.L.	Do.	7th February 1868.
8596	Jepson, John	"Vimeira"	P.P.	Choleraic diarrhœa	7th February 1868.
7211	McKenzie, James	"Clyde"	T.L.	Drowned	17th February 1868.
9542	Owen, Hugh	"Norwood"	P.P.	Heart disease	24th February 1868.
8465	Wiggan, Richard	"Racehorse"	„	Fever	24th February 1868.
9688	Clarke, George	"Hougoumont"	„	Ch. dysenteria	3rd March 1868.
8488	Barton, John	"Vimeira"	„	Fever	5th March 1868.
4254	Jackson, George	"Clara" 1st	T.L.	Natural causes	18th March 1868.
8492	Blackburn, Thomas	"Vimeira"	P.P.	Do.	2nd April 1868.
9015	Taylor, George	"Belgravia"	„	Do.	5th April 1868.
9480	Johnson, Thomas	"Norwood"	„	Consumption	12th April 1868.
7762	Lawrence, Henry	"Clara" 2nd	T.L.	Pleurisy and phthisis	12th April 1868.
9691	Coles, Richard	"Hougoumont"	P.P.	Ch. dysenteria	11th April 1868.
8467	White, Young	"Racehorse"	„	Disease of bowels	21st April 1868.
5626	Basson, James	"Palmerston"	T.L.	Natural causes	18th February 1868.
9232	Luney, Patrick	"Corona"	P.P.	Fever	23rd April 1868.
8569	Howell, James	"Vimeira"	„	Diabetes	27th April 1868.
7303	Woffen, Henry	"Clyde"	T.L.	Dysentery	2nd April 1868.
8498	Bowstead, Thomas	"Vimeira"	P.P.	Fever	6th May 1868.
9651	Austin, Charles	"Hougoumont"	„	Do.	7th May 1868.
6628	Jones, Thomas	"York"	T.L.	Kick from a horse	30th April 1868.
9741	Gabbites, Henry	"Hougoumont"	P.P.	Fever	17th May 1868.
5330	McDonald, Joseph	"Edwin Fox"	T.L.	Phthisis	20th May 1868.
9909	Whittaker, John	"Hougoumont"	P.P.	Typhoid fever	15th June 1868.
8194	Abrahart, William	"Racehorse"	„	Bronchitis and phthisis.	16th June 1868.
7477	Lodge, Joseph	"Lord Dalhousie"	T.L.	Disease of kidneys	26th June 1868.
5985	Williams, John	"Lincelles"	„	Fall from a cart	5th July 1868.
8857	Goldstone, David	"Belgravia"	P.P.	In a fit	7th June 1868.
6258	Carpenter, Joseph	"Norwood" 1st	T.L.	General debility	13th May 1868.
6135	Rowe, William	"Lincelles"	„	Paralysis	28th July 1868.
7714	Hall, William	"Clara" 2nd	„	Thrown from a horse.	18th August 1868.
7281	Thomas, George	"Clyde"	„	Drowned	18th September 1868.
6796	Young, John	"York"	„	Cancer	2nd October 1868.
7759	Kitchen, Frederick	"Clara" 2nd	„	Disease of lungs	11th October 1868.
6756	Turvey, Richard	"York"	„	General debility	19th November 1868.
6208	Ashby, John	"Norwood" 1st	„	Brain disease	15th December 1868.
8276	Gibson, George	"Racehorse"	P.P.	Natural causes	9th December 1868.
7863	Stafford, John	"Clara" 2nd	T.L.	Heart disease	20th December 1868.
8167	Walker, Henry	"Merchantman" 2nd	P.P.	Phthisis	25th December 1868.
9515	Martin, Joseph	"Norwood" 2nd	„	Apoplexia	14th February 1868.
		Total	43		

Comptroller-General's Office, Perth,
24th February 1869.

HENRY WAKEFORD,
Comptroller-General.

No. 12.

STATEMENT of Expenditure for the Year ended 31st March 1868.

Vote.	Service.	Amount.		
		£	s.	d.
1	General superintendence	16,976	15	5
2	Religious instruction	2,666	10	8
3	Medical treatment	2,399	12	2
4	Provisions	31,817	7	8
5	Medicines	2	17	9
6	Fuel and light	1,876	13	11
7	Prison stores and clothing	157	3	1
8	Land and water transport	4,049	19	4
9	Works, buildings, and stores	2,205	11	11
10	Miscellaneous	1,415	2	2
11	Magistracy and police	14,655	3	0
12	Gratuities to prisoners, and private cash and earnings	2,050	0	0
	Total convict	80,272	17	1
13	Total military service	33,468	15	11
	Total	113,741	13	0

Amounting to one hundred and thirteen thousand seven hundred and forty-one pounds thirteen shillings.

Commissariat, Western Australia,
Perth, 22d February, 1869.

(Signed) J. T. JOHNSTON.

No. 13.

SIR, Fremantle Prison, January 1, 1869.

I HAVE the honour herewith to forward you the annual returns, showing the amount of sickness present among the officers and inmates of this prison during the past twelve months.

In my annual report twelve months ago I made reference to the increased prevalence of cases of diarrhœa and dysentery which had occurred both amongst the casual sick and in the hospital wards towards the close of the year 1867. I attributed this prevalence to a defective state of the sewers, and mentioned that, at my suggestion, an attempt was then about being made to substitute "the dry earth system" throughout the prison for the sewers and cesspits. In continuation of those remarks I now have to report that in January and February 1868, before the earth system could come into full operation, the number of these cases of diarrhœa and dysentery had increased so much that I thought it necessary to recommend that the prison population should be diminished, and accordingly in the month of February, in the space of a few days, about 150 prisoners were sent away to road parties and other stations: this seemed to have the desired effect, the diarrhœa gradually ceased, and the prison reverted to its former healthy condition.

I have no hesitation in giving unqualified preference to the "dry earth system" over the sewer and cesspit plan; it has now been under trial more than ten months, and I consider that, under many disadvantages, it has answered admirably. One special disadvantage that obtains here consists in the nature of the soil, which is sand differing but little from that on the beach, and which is I expect as ineffective a deodorizer as can be, consequently quantity must act as the imperfect substitute for quality; again, the sand cakes so firmly and adhesively with the liquid excreta that it cannot be used, as it should be, in the separate cells at night, on account of the great difficulty each prisoner has in emptying the contents of his utensil in the morning. Despite these disadvantages, however, nine-tenths of the whole refuse matter of the prison has been deodorized, carted away, and more or less utilized, instead of being pent up in sewers and cesspits, there to remain until some accidental circumstance should allow of leakage of liquid refuse into wells, or the escape of noxious emanations into the air. I have the greatest faith in the efficacy of this dry earth system, and hope to see it better perfected and thoroughly carried out in the prison.

Table III. shows the causes for admission to hospital during the year. The aggregate number of cases is much the same as in former years; and there is little to remark upon except the cases of diarrhœa and of those "under observation" for mental disorders. The cases of typhoid fever were sporadic in their nature: the 1st case admitted was a probation prisoner from one of the out-stations, the 2nd was a prisoner working within the walls of the prison, and the 3rd was a ticket-of-leave holder from the town of Fremantle.

Table VI. is a nominal list of those who were under observation in the prison hospital. It will be seen that the cases were 18 in number, 2 being ticket holders, and the remainder prisoners: 13 of these

WESTERN AUSTRALIA.

cases were ultimately sent to the lunatic asylum, 3 were discharged convalescent, and 2 remain under treatment. Many of these cases had previously been from time to time under observation for mental derangement, and I have only to remark that I do not think the prison discipline in this colony is in any way answerable for their malady. As I have previously remarked, every convict ship arriving here brought its quantum of men with whom it was merely a question of time as to when they should become inmates of the asylum.

The health of the subordinate officers of the prison has been better this year than usual, as will be seen in Table V. One officer died from disease of the liver and stomach. He had only been a short time in the service, and had not been a long time in the colony.

I have again much pleasure in testifying to the thorough efficiency and zeal of principal Warder Lyons, both as compounder and chief disciplinary warder in the hospital.

I have, &c.

The Hon. the Comptroller-General, &c. &c. &c.

(Signed) G. C. ATTFIELD, Surgeon, Fremantle Prison.

No. I.

TOTAL NUMBER TREATED.

	Probation and Re-convicted Prisoners.	Conditional Pardon, Ticket-of-Leave, and Expirees.
Number of patients in hospital, 31st December 1867	21	9
Number admitted during 1868	224	44
Total	245	53
Number discharged during 1868 :—		
Cured or relieved	201	26
To invalid depôt	—	13
To the lunatic asylum	13	2
Died	9	7
Remaining in hospital	22	5
Total	245	53

No. II.

NUMBER and CAUSE of DEATH.

	Probation and Re-convicted Prisoners.	Conditional Pardon, Ticket-of-Leave, and Expirees.
Paralysis	1	2
Diabetes	1	—
Disease of heart	2	2
Pleurisy	—	1
Phthisis	3	—
Choleraic diarrhœa	1	—
Disease of kidneys	—	1
Cancer	—	1
Old age and debility	1	—
Total	9	7

No. III.

DISEASES for which PATIENTS were admitted in 1868.

Wounds, abscess, ulcer, &c.	52	Cynanche	2
Diarrhœa	39	Orchitis	3
Dysentery	11	Periostitis	2
Ophthalmia	17	Gonorrhœa	3
Rheumatism	17	Onychia	2
Observation	18	Delirium tremens	1
Phthisis	11	Conjunctivitis	1
Febricula	16	Hemiplegia	1
Debility	10	Hemorrhoids	1
Melæna	4	Lumbago	1
Synovitis	8	Otorrhœa	1
Catarrh	5	Asthma	1
Scurvy	10	Stricture of rectum	1
Stricture	3	Ascites	1
Paralysis	3	Fever, typhoid	3
Morbus cordis	3	Do., continued	2
Sprain	4	Cephalalgia	1
Epilepsy	3		
Pleurisy	4	Total	268
Fracture	2		
Hepatitis	2		

No. IV.

NUMBER in HOSPITAL.

Daily average Number of Prisoners.	Number admitted into Hospital.			Average daily Number in Hospital.				Proportion per Cent. to daily average Number of Prisoners, Ticket-of-Leave, &c., not included.
	Probation and Re-convicted Prisoners.	Expirees, Ticket-of-Leave, and Conditional-Pardon Prisoners.	Total.	Fremantle Prison.	Out-Stations.	Ticket-of-Leave.	Total Daily Average Number of Prisoners.	
1st quarter - 491	69	11	80	17	7	9	33	4·88
2nd „ - 495	64	13	77	17	8	10	35	5·05
3rd „ - 480	48	10	58	16	8	8	32	5·00
4th „ - 470	41	12	53	15	7	6	28	4·70

Average daily number of prisoners in hospital throughout the year, ticket-of-leave, expirees, &c., not included	23·25
Proportion per cent. to daily average number of prisoners	4·9
Largest number of hospital sick in one day (of all classes)	44
Smallest number of hospital sick in one day (of all classes)	20

No. V.

SICKNESS, &c. of SUBORDINATE OFFICERS.

Daily Average of Subordinate Officers.	Daily average Number of Sick, including Accidents.	Average Number of Days each Sick Officer was under Treatment.	Died.
37	$\frac{163}{366}$	4	1

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No. VI.

PRISONERS under TREATMENT for MENTAL DISORDERS during 1868.

Class.	Register.	Name.	Age.	Date of Arrival in the Colony.	Character of present Attack.	Whether previously Insane or mentally affected.	Date of Admission into Hospital.	Remarks.
P.P.	9396	—	24	July 1867	Dementia	Not known	Dec. 1867	Discharged to light labour class, 5/1/68.
S.D.C.	9237	—	23	December 1867	Delusions	Not known	Feb. 1868	„ cured, 17/2/1868.
P.P.	9286	—	29	„ 1867	Delusions	Not known	April 1868	„ to lunatic asylum, 9/4/68.
R.C.P.	6375	—	34	June 1862	Mania	Not known	April 1868	„ „ 9/4/68.
Local.	—	—	35	—	Dementia	Not known	March 1868	„ to invalid depôt, 14/4/68.
S.L.	8961	—	36	June 1866	Dementia	Not known	Feb. 1868	„ to lunatic asylum, 26/4/68.
P.P.	9081	—	23	December 1866	Dementia	Not known	Feb. 1868	„ „ „ 20/6/68.
Do.	470	—	22	December 1863	Delusions?	In February 1866	June 1868	„ „ „ 17/6/68.
R.C.P.	5350	—	36	November 1858	Delusions	Has been under observation for mental disorder previously in hospital.	May 1868	Discharged to lunatic asylum, 4/5/68, and died of bronchitis, 20/5/68.
P.P.	8034	—	30	September 1864	Delusions	Not known	May 1868	Discharged to lunatic asylum, 20/6/68.
R.C.P.	7191	—	40	May 1863	Delusions	Was discharged from asylum apparently well in March 1868.	Sept. 1868	„ „ „ 8/9/68.
P.P.	8433	—	42	August 1865	Phrenzied	Not known	March 1866	„ „ „ 20/6/68.
R.C.P.	6208	—	52	June 1862	Violently insane	Was discharged from asylum apparently well in October 1868.	Oct. 1868	„ „ „ 27/10/68.
P.	9481	—	25	July 1867	Delusions	Was discharged from asylum apparently well in July 1868.	Aug. 1868	„ „ „ 15/9/68.
T.L.	7380	—	30	December 1863	Imbecile	Not known	Nov. 1868	„ „ „ 21/12/68.
P.P.	9719	—	44	January 1868	Dementia	Not known	April 1868	„ „ „ 21/12/68.
Do.	9113	—	29	December 1868	Dementia	Was discharged from asylum apparently well in July 1868.	Dec. 1868	Detained in hospital (under observation).
Do.	9160	—	30	December 1868	Dementia	Ditto	Dec. 1868	„ „ „

No. 14.

Fremantle Lunatic Asylum,
January 1, 1869.

SIR,

I HAVE the honour herewith to forward you the Returns showing, as connected with the Convict Department, the number of admissions, discharges, deaths, &c. of lunatic patients during the past year.

Fifteen patients have been admitted; one man (probation prisoner, Wm. Johnson) was admitted twice, thus making altogether sixteen admissions during the year. Of these, one was an expiree, one a conditional pardon man, two were ticket-of-leave holders, and the remainder were probation or re-convicted prisoners. Most of these patients, I think, have had for some time a predisposition to insanity, and were men of extremely low mental organization and cultivation, and many of them had, from time to time, been "under observation" and treatment in the prison hospital for mental disorder.

Nine patients were discharged convalescent during the year, but two of them were subsequently re-admitted.

Two patients died in the course of the year. One death resulted from effusion on the brain with epileptic fits, and the other, 15 days after admission to the asylum, from acute bronchitis.

It has not been found necessary to have recourse to any description of mechanical restraint; seclusion, for a longer or shorter time, on the occurrence of any violence of temper or of phrenzy, has answered every purpose.

No attempt at suicide or escape from the asylum has been made during the past 12 months.

For a number of years I have been invariably enabled to report the absence of any serious assaults on the part of lunatic patients either on each other or on the warders in charge of them; but this year I have to record two, the details of which I duly submitted to you at the time of their occurrence. One was by a lunatic on a fellow patient, and the other by a lunatic on principal warder Ramsay.

I have written to express my opinion that necessity exists for increased numerical supervision, and this opinion is now under your consideration.

The general health of the lunatics under my individual charge at the asylum has been most satisfactory, and the total absence of any epidemic is a good and sufficient test of the sanitary condition of the place; the water supply is good and abundant, the grounds spacious, the sleeping wards well ventilated, plenty of occupation in the shape of gardening work, and ample means of recreation in the fives court and on the cricket ground.

There is a very fair use made of the ample supply of books sent down from time to time by the chaplain from the prison library.

I have, &c.
(Signed) G. C. ATTFIELD,
Surgeon, Fremantle Prison.

The Hon. the Comptroller-General,
&c. &c. &c.

STATISTICAL RETURN appended to Annual Report of Lunatic Asylum, 1868.

	Imperial Male Lunatics.
Number of patients [connected with convict department] remaining in the asylum on the 31st of December 1867	28
Number of patients [connected with the convict department] admitted to the asylum during the year 1868	16
Total	44
Discharged	9
Died	2
Total	11
Remaining under treatment December 31st 1868	33

NOMINAL LIST of PATIENTS ADMITTED.

Class.	Register.	Names.	Age.	Arrived in the Colony.	Ship.	Admitted to the Asylum.	Character of Disease.	Remarks.
P.P.	9081	—	24	Dec. 1866	"Corona"	May 1868	Dementia	Remains in the asylum.
"	9286	—	29	"	"	April 1868	Delusions	Do.
"	7470	—	24	Dec. 1863	"Lord Dalhousie."	June 1868	"	Discharged convalescent July 21st 1868.
"	8433	—	45	Aug. 1865	"Racehorse"		Mania	Remains in the asylum.
"	8034	—	32	Sept. 1864	"Merchantman"	"	Dementia	Do.
"	9481	—	28	July 1867	"Norwood"	March 1868	"	Discharged convalescent in July 1868, and re-admitted in September.
"	9719	—	44	Dec. 1867	"Hougoumont"	Dec. 1868	"	Remains in the asylum.
R.C.P	6375	—	34	June 1862	"Norwood"	April 1868	Mania	Discharged convalescent in November 1868.
"	5330	—	36	Nov. 1858	"Edmund Fox"	May 1868	Mania with delusions.	Died of bronchitis in May 1868.
"	6208	—	53	June 1862	"Norwood"	Oct. 1868	Mania	Died from effusion on the brain with epilepsy in December 1868.
"	7191	—	44	June 1863	"Lord Clyde"	Sept. 1868	Delusions	Remains in the asylum.
T.L.	8961	—	35	July 1866	"Belgravia"	April 1868	Dementia	Do.
"	7380	—	44	Dec. 1863	"Lord Dalhousie."	Dec. 1868	Dementia Imbecility.	Do.
C.P.	7067	—	38	May 1863	"Lord Clyde"	Sept. 1868	Mania	Discharged convalescent in December 1868.
Exp.	5815	—	40	Feb. 1860	"Palmerston"	May 1868	Dementia	Discharged convalescent in August 1868.

DISCHARGED.

Class.	Register.	Names.	Age.	Arrived in the Colony.	Ship.	Admitted to Asylum.	Character of Disease.	Discharged.	Remarks.
P.P.	8939	—	38	July 1866	"Belgravia"	Nov. 1866	Mania	Dec. 1868	
"	9113	—	35	Dec. 1866	"Corona"	Jan. 1867	Delusions	July 1868	
"	7470	—	24	Dec. 1863	"Lord Dalhousie."	June 1868	"	"	
"	9481	—	28	July 1867	"Norwood"	March 1868	Dementia	"	Readmitted to the asylum September 16th, 1868.
R.C.P.	6375	—	34	June 1862	"	April 1868	Mania	Nov. 1868	
"	7191	—	44	May 1863	"Lord Clyde"	Sept. 1867	Delusions	July 1868	Do.
"	7785	—	44	April 1863	"Clara"	Oct. 1867	"	Dec. 1868	
C.P.	7067	—	28	May 1863	"Lord Clyde"	Sept. 1868	Mania	"	
Exp.	8515	—	40	Feb. 1861	"Palmerston"	May 1868	Dementia	Aug. 1868	

DIED.

Class.	Register.	Names.	Age.	Arrived in the Colony.	Ship.	Admitted to Asylum.	Character of Disease.	Date of Death.	Remarks.
R.C.P.	5330	—	36	Nov. 1858	"Edmund Fox"	May 1868	Mania with delusions.	May 20, 1868	Bronchitis.
"	6208	—	53	June 1862	"Norwood"	Oct. 1868	" "	Dec. 12, 1868	Effusion on the brain with epilepsy.

G. C. ATTFIELD.

No. 15.

Western Australia.

RETURN OF WORK executed by Convict Labour in the Districts under the supervision of the Clerk of Works of the Convict Department, during the Year 1868.

FREMANTLE. The following work has been done in the shops at Fremantle Prison, viz.:—*Fremantle.*—Ironwork for the new boat house, south jetty; anchors, beacons, buoys, mooring plates, &c., and sundry fittings for and repairs to boats for harbour master's department, also copper air-tight cases for lifeboat, same service; shoeing imperial and colonial horses; sundry repairs and alterations to boats, carts, and flats; fittings for and repairs to boats for the water police department; repairs to boys' school; painting and incidental repairs to imperial buildings; making additions, &c. to the late R.E. barracks, and to the pensioners' barracks; repairs to lighthouse; repairs to harbour master's quarters; trucks for the south jetty tram; repairs to the north and south jetties; repairs, &c. to the pump house and watering jetty; numerous articles made for, and sundry repairs to others of barrack and office furniture; preparation of Goverment House for military quarters; mess-room furniture for 2/14th regiment; mat-maker's loom; four night carts; two cranes with winches for south jetty; sundry tools, &c. for use in putting together the steam dredger, and general repairs to and renewal of quarry and other tools, &c. *Rottnest.*—Making sundries for pilot service; repairs, &c. to pilot boats; repairs and other work for establishment, &c. *Perth.*—Sundry work and fittings for the new pensioners' barracks and hospital; beer engine, &c. for military canteen; pair of gates &c., government domain; crabs and cranes for jetties; iron and wood work for roof of town hall, together with general smith's and carpenter's work; chairs for court house; guttering and sundries for public offices; table and chairs for superintendent of police; casements for boys' school; tools, &c. for work at town hall, &c. *Albany.*—Crane and crab complete for jetty; cylinder, &c. for well at public offices; sundries for water police and harbour master's departments; also sundry smith's and carpenter's work for the Bannister, 36 mile, 131 mile, 224 mile, and Gordon police stations, &c. *Bunbury.*—Sundial for depôt; ironwork for the Collie and Henty bridges; ditto for jetty extension, &c. *Champion Bay.*—Joiner's work, &c. for the new pensioners' quarters; sundries for court house; tram rails and trucks for jetty tram; ironwork for Irwin jetty; crab and crane for ditto; various fittings, &c. for water police department, &c.

Also, a bell made for *Northam;* sun-dial for *Newcastle;* bell and pair of gates for *Pinjarrah* Church; six cast-iron pillar post receivers for *postal department, Perth;* ironwork for the extension of *Vasse* jetty; repairs to *Mandurah* ferry boat; and sundries for residency, *Roebourne,* &c.

The parties working out of the prison have been employed as follows:—*Town Trust party,* in removing sand and quarrying and breaking stone, and spreading same on the streets and roads. *South Jetty party,* sawing and preparing timber for and laying down a platform between jetty and commissariat; levelling ground, and fitting and laying rails for tram; and driving piles for and erecting the new boat house. *Bar party* in quarrying and removing stone from bar, and clearing channel. The party was removed in May for the winter, but has again resumed work. *Groin party* has made groins in the river to direct the current, and fixed stakes and wattling in various parts for the same object. The *Stringent party* has quarried and broke stone for the Perth City Council, Guildford road, Perth causeway, and for spreading on the North Fremantle bridge, and procured and dressed stone also for the groins and the new store near the bridge, which latter they have built and completed.

A party was also employed in quarrying stone for and building a sea wall near the bridge, and after in preparing the site for putting together the steam dredge, and in erecting the building, sheds, &c. on it.

Parties have also at different times during the past year been working in clearing the North Ferry point, and removing sea-weed, &c.; constructing the new tramroad between north jetty and the bridge; making roadway to ladies' bathing place; preparing the late R.E. barracks for the 2/14th regiment; wattling and banking the north beach; quarrying stone for building purposes; sundry work at lunatic asylum, &c.

The party formerly called the *Inside Stringent party,* till lately employed within the prison, quarried stone for and rebuilt the wall running at back of prison yards, removed the sand, &c., and filled in and levelled the bank adjoining. In August, when they had completed this work, they were amalgamated with the "Outside S. D. party."

North Fremantle.—The parties stationed at the depôt have erected and completed the new stock-yard; quarried and broke stone for metal, and repaired three miles of road, and covered same with metal; and produced, by burning stone, about 20,000 bushels of lime.

Clarence Road party has made about 2½ miles of this road by filling in, blocking, and spreading with metal.

Point Resolution.—Work was recommenced here by a party in March, since when, 7,307 cubic yards of stone have been quarried, and forwarded to Perth for works.

Freshwater Bay.—The party here has been making and repairing and keeping in good order the Perth road between 2 and 6 mile posts.

UPPER CANNING. *Bridge party.*—This party, which commenced work in October last, has been employed since in preparing the necessary piles and sawn timber to erect the bridge, which they are now proceeding to do.

MURRAY DISTRICT. *Woongong and North Dandalup party* has made 3½ miles of road, putting in culverts where necessary; drained and repaired 4 miles of road, and made good two bridges; and prepared and fixed railings to same.

Pinjarrah.—This party finished their end of the new line in March, and were removed to Barragup to fell and prepare timber preparatory to building the bridge there. This bridge is now nearly completed, as well as the approaches to it.

Pinjarrah and Harvey party made 3 miles of road, and cut 6 miles of drain to same, putting in numerous culverts; and drained, repaired, and made good other portions of road. After completing the work here, they removed last November to Marunup Brook, and commenced clearing a road on the Williams line.

BUNBURY. *Harvey.*—This party has made extensive repairs to 14 miles of road, raising it in many parts, cutting about 6 miles of drain, and put in eight large and several small culverts.

Collie Bridge party has been kept making the Collie and Henty bridges, post and rail fences, and the approaches. The necessary timber has been got and prepared for these works, and the Collie bridge is completed while the other is nearly so.

Blackwood Road parties (2) have cleared about 8 miles and made 5 miles of road. One bridge has been erected, and several large culverts put in, and numerous portions of road repaired and made good.

Ferguson Road party has made about 2½ miles of road, and repaired several bad places.

Vasse Road.—This party has cleared and made about 7 miles of this new road towards Vasse.

Bunbury Depôt.—Shoeing; reshingling roof of depôt; incidental repairs to government buildings, &c., and to barrack and office furniture and tools; removing and refixing flooring at police office, and fitting up cupboard for lockup; widening approach to jetty, and building two stone walls to same; quarrying and breaking stone for metal, and spreading on roads, and keeping in repair the streets, &c.; repairing Capel bridge and causeway; clearing ground and removing trees and stumps for the new Botanical Gardens, &c.

VASSE. *Warren Road party* (No. 1).—This party has repaired and made good the road between the 16 and 39 miles, erecting four bridges, and several culverts and causeways.

Warren Road party (No. 2) has executed extensive repairs to the road between the Warren and Donnelly, putting in several bridges and culverts, and in many places re-formed the road.

Depôt party has raised a causeway and put in culverts at Abbey's Ford; metalled and repaired the Busselton causeway, Stanley Street, &c.; repaired police boat; executed work at police station; erected sheds, &c. at depôt; and drained several low swampy streets.

CHAMPION BAY. *Depôt.*—Erecting new pensioners' quarters; building bonded store and post office; additions to court-house, and verandah to warder's quarters; sundry repairs at residency, police quarters and stables, court-house, police boats, pound, and to depôt and imperial buildings; procuring wood for and burning stone for lime; laying jetty trams and making and repairing trucks for same; making a landing stage at jetty; shoeing horses; and repairing barrack and office furniture, tools, &c.; planting and fixing bush, &c. upon sand-banks, and other work to stay sand drifts; clearing sand from and keeping in good repair the streets, &c.

Mines Road.—Several lengths of this road have been repitched and metalled; 2 miles of road cut through "Table" and other hills; 2 bridges built, and approaches filled in and made to same, and other portions cleared, drained, and repaired. The Bulla bridge has also been built and completed.

Dongara party.—About 10 miles of road between the Irwin crossing and Denison's town site have been cleared, grubbed, formed, and made; and two wells by roadside sunk.

Greenough Flats party has repaired the road in many bad places by claying same, putting in several culverts, and repairing others; broke stone for metal, and spread on road.

ALBANY.—Building boat house and erecting verandah to quarters; making additions to Freemason's Hotel; painting, &c. the Point King and Breaksea lighthouses; fixing crane at jetty; repairs, &c. to depôt, police station, old barracks, harbour master's quarters, and to pilot station, boats, and gear sheds; shoeing, and general repairs to tools, &c.

Procuring material for and making York Street; building 800 feet of retaining wall; digging out and preparing foundation for new public offices, &c.

Seven Mile party has been employed in making extensive repairs on the Perth road from Albany to the 12th mile; draining, and putting in several culverts.

King Road party.—Grubbed, cleared, and made 9 miles of road, and erected five large culverts; and prepared timber for York Street, &c.

Hay Road.—The Hay River bridge has been altered and strengthened; 6 miles of road made, and several culverts built.

Mount Barker.—The police station, stable, and outbuildings are completed, and the fencing of 100 acres done; and 1½ miles of road cleared and made.

Albany Road.—The parties working on this road have made and metalled about 18 miles, and kept in general repair the whole line between Perth and Albany, cutting about 17 miles of drain. Six bridges have been erected, and eight extensively repaired (having been partly destroyed by bush fires); 13 culverts put in, and 9 repaired.

The 36 mile and Bannister police stations have been completed, and that at the 131 mile erected and finished, and additions and other work done at the Gordon.

JAMES MANNING,
Clerk of Works.

Clerk of Works Office, Fremantle,
January 29, 1869.

The Hon. the Comptroller General,
&c. &c &c.

MEMORANDUM.

Public works executed by convict labour in Perth, Swan, Toodyay, York, and Beverley districts during the year 1868.

PERTH.—Sundry repairs, alterations, and improvements to Perth prison; erecting engine house at the rear of pensioners' barracks; sundry alterations to, making fittings and fixing for canteen; erecting store-room and fitting up ditto; removing sand from rear of barracks; levelling barrack and hospital yard; fitting up store-room, kitchen, and kitchen store-room, and assistant's quarters, new verandah, &c., &c.; sundry alterations, levelling, draining, &c., for soldiers' barracks for 14th Regiment of foot; erecting new fence, gates, &c., around the barrack yard, &c., &c. *Perth streets.*—893 yards of road pitched and metalled; 470 yards of footpath complete with kirbing; one bridge erected in Water-street; about half a mile of streets cleared; pathways and roadways repaired in Murray-street, Hay-street, William-street, St. George's and Adelaide terrace, and Barrack-street; erecting new town hall; making 916,000 bricks, and carting same distance of two miles; macadamizing Perth and

WESTERN AUSTRALIA.

Fremantle road; erecting a landing jetty at Sutherlands Bay; and repairing road under Mt. Eliza; erecting sea-wall, &c. &c.

Perth causeway.—Removing old causeway, old bridges, and raising new causeway embankments; raising and metalling roadway.

West-Guildford-road.—Cleared about five miles of road.

Canning-road.—Making blocked and metalled road, four parties averaging 12 men each through the year.

Guildford-road.—755 yards road formed, drained, and metalled, and road for nine miles kept repaired; quarried 2,883 cubic yards stone.

Swan, Gingin, Bindoon, and Victoria Plains road.—8,187 yards road metalled, 3,967 yards cleared, 15,420 yards formed and drained, 1,200 yards repaired, 36 culverts erected, and two bridges repaired.

Toodyay-road.—6,723 yards road metalled, 5,420 yards cleared, 2,707 repaired, 18 culverts erected, one bridge renewed.

York-road.—5,083 yards road metalled, 1,290 yards cleared, 15 culverts erected, 8,678 yards repaired.

Beverley, Yangedine, Northam, and Toodyay Valley road.—12,022 yards road metalled, 6,828 yards cleared, 9,364 yards repaired, 19 culverts erected, causeway at Katerine brook erected and raised three feet, approaches at either end raised six feet for a distance of 60 yards.

RICHARD R. JEWELL.

The Honourable
The Comptroller-General.

23/2/69. C.W.

TASMANIA.

TASMANIA.

No. 2.

No. 2.

COPY of a DESPATCH from Governor T. GORE BROWNE, C.B., to His Grace the Duke of BUCKINGHAM AND CHANDOS.

(No. 47.)

Government House, Hobarton, Tasmania,
September 1, 1868.

MY LORD DUKE,

Report, 5 Aug. 1868. Commandant Port Arthur, 25 July 1868. Return. Return.

I HAVE the honour to forward the annual report of the Convict Department in Tasmania, signed by Mr. Belstead on behalf of the Comptroller General, who is, I regret to say, dangerously ill.

Your Grace will observe that the number of Colonial prisoners has been decreased, and that the cost of each convict under sentence has been consequently increased; "this has arisen from the impossibility of diminishing the cost of supervision in proportion to the decrease in the number of inmates, and the fact that those now retained in "the establishment are principally men of the most dangerous class." On this subject I have, however, written at length in former despatches.

Out of 533 prisoners, the daily average of men available for reproductive labour has been only 135, and their labour is valued at 38*l.* per annum each. As among these men many have soft hands unfitting them for hard work, and many others are advanced in age, the return is a large one.

I am still, however, of opinion that in the end it would be found more economical to forego the advantage derived from labour (which in this particular case amounts to 5,169*l.*) and to add to the present expense by employing none but free men, even in cooking and household work. Punishment might then be made far more severe, the time of sentences might be shortened, and the deterring effects would be greatly increased. It would, however, be so clearly advantageous to Her Majesty's Government to transfer the whole of these establishments to the Colonial Government, as recommended in my Despatch No. 11, of 24 June 1867 (still unanswered), that I need say no more on the subject.

I have, &c.

His Grace
the Duke of Buckingham and Chandos,
&c. &c. &c.

(Signed) T. GORE BROWNE,
Governor.

Enclosure in No. 2.

Comptroller-General's Office, Tasmania,
August 25, 1868.

SIR,

IN the absence of the Comptroller-General, who is, I regret to say, prevented by illness from addressing you himself, I have the honor to submit, for transmission to the Right Honourable the Secretary of State for the Colonies, the annual report, on the Convict Department in Tasmania, for the year ended 30th June 1868.

In this office there is no alteration.

Port Arthur.

I enclose the report of the Commandant of this the only station now under the Imperial Government; this report will be found to supply full information regarding the establishment. The strength on the 30th June was,—male convicts under sentence or on probation, 379; paupers and invalids, 188; lunatics, 94, giving a total of 661 individuals; of this number, 283 male convicts, 1 pauper, and 6 lunatics, 290 in all, were chargeable to the Colony, and 187 paupers, 88 lunatics, and 96 convicts under sentence, 371 in all, to Imperial funds; of these 96 convicts, 58, or nearly two thirds, are held under sentence of life.

The general conduct of the prisoners during the year has, on the whole, been satisfactory; only two cases of absconding have occurred, and in each case the prisoner was recaptured within forty-eight hours of escape.

In the last report reference was made to a new building for the insane then in course of construction; the building has now been completed, at a cost little exceeding the pay for the mechanical labour which the men on the Station could not execute, and has been found to afford very suitable accommodation for the unfortunate inmates. The new dietary sanctioned by the Secretary of State's Despatch, No. 3, of 25th March 1867, has now been in operation for upwards of 12 months, and has been found to work well, being also attended with considerable reduction of cost in the item of rations. During the year, the scale of money-earnings has been amended, and the maximum amount which can now be earned by any convict is fixed at one shilling and fivepence a week; this alteration was thought desirable after an experience of some years in the working of the system. From a return of the expenditure of the establishment for the year 1867, the cost of maintenance at Port Arthur has been found to be, for a convict under sentence, 35*l.* 10*s.* 8*d.* (less a sum to be deducted on account of the value of material raised by convict labour); for a pauper, 24*l.* 7*s.* 2*d.*; hospital patient, 28*l.* 17*s.* 5*d.*; and for a lunatic, 41*l.* 6*s.* 6*d.* per annum; these rates are in excess of previous years, and this has arisen from the reduced strength of the establishment and the impossibility of diminishing the cost of supervision in proportion to the decrease in the number of inmates, and the fact that those now retained at the establishment are principally men of the most dangerous class, requiring very careful supervision. The amount realized by the labour of the men as shown in Tables E. and F. attached to the Commandant's report may, however, be looked upon as highly satisfactory, when the very small proportion of the total number of inmates who can be employed at remunerative works is considered; the amount of labour employed being estimated in the aggregate at 42,044 days, or a daily average of 135 men.

I am aware that the Comptroller-General is thoroughly satisfied with the efficient manner in which the establishment is conducted by Mr. Boyd the Commandant.

I enclose the usual returns showing the number and description of individuals maintained at the cost of the Imperial Government and in Imperial institutions; return No. 4 shows a diminution of 47 male and 3 female convicts, as compared with the year 1867.

Colonial Establishments.

At the Prisoners' Barracks, Hobart Town, there was only one individual supported by the Imperial Government.

The Cascade Factory.

A portion of this establishment formerly used exclusively for female convicts and paupers has been converted into a depôt for the reception of male paupers, and those chargeable to Imperial funds are now maintained there while awaiting removal to Port Arthur; on the 30th of June there were 4 male paupers, 15 female paupers, and 1 child on Imperial funds.

There were at the Hospital for Insane, New Norfolk, 41 lunatics; at the Colonial Hospital, Hobart Town, 6 patients wholly and 2 half chargeable; and at the General Hospital, Launceston, 2 patients.

At the Queen's Orphan Asylum there were 62 children wholly and 45 half chargeable, being equal to a charge for 84½ children upon Imperial funds, a reduction of 29 children since the last report.

I have, &c.

(Signed) C. T. BELSTEAD,

For the Comptroller-General,

(Sick).

His Excellency the Governor,

&c. &c. &c.

TASMANIA.—COMPTROLLER-

No. 1.—DISTRIBUTION RETURN of CONVICT

STATIONS AND ESTABLISHMENTS.	Convicts.								Free Men.							Female Convicts.				Free Women.			Children.	
	Chargeable to Colonial Funds.		Chargeable to Imperial Funds.						Chargeable to Imperial Funds.				Chargeable to Colonial Funds.			Chargeable to Imperial Funds.				Chargeable to Imperial Funds.			Imperial Funds.	
	Under Sentence of Penal Servitude or Imprisonment passed at Superior Courts.	On Probation for Pardons.	Under Sentence of Penal Servitude passed at Superior Courts.	On Probation for Ticket-of-Leave and Conditional Pardon.	Passholders under Sentence.	Passholders under Sentence in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence in Hospital, Invalids, and Lunatics.	Under Magisterial Sentence.	Paupers and Invalids.	In Hospital.	Lunatics.	Under Magisterial Sentence.	Paupers and Invalids.	Lunatics.	Under Sentence of Penal Servitude passed by Superior Courts.	Passholders in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence in Hospital, Invalids, and Lunatics.	Paupers and Invalids.	In Hospital.	Lunatics.	Boys.	Girls.
Comptroller-General's Office -	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Port Arthur - - -	262	2	63	11	—	27	12	20	1	163	—	65	12	1	6	—	—	—	—	—	—	—	—	—
	4 Invalids. 3 Lunatics.		7 Invalids. 2 Lunatics.																					
Prisoners' Barracks - -	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cascade Factory - - -	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	15	—	—	—	1
Watchhouses and Gaols - -	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hospitals and Lunatic Asylum	—	—	—	—	—	1	—	—	—	—	1	16	—	—	—	—	—	—	—	—	1	24	3	4
Queen's Orphan Asylum - -	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	43	41
TOTAL - -	269	2	72	11	—	28	13	20	1	167	1	81	12	1	6	—	—	—	—	15	1	24	46	46

Total Convicts maintained by Government - - 415
Passholders illegally at large, or otherwise unaccounted for - - - - - - 113
Ticket-of-Leave Holders earning their own living - 21
Total Males - 549
Females - 11
Total Males and Females - 560

TASMANIA.—CONVICT

No. 2.—RETURN showing the STRENGTH of the CONVIC
Taken from the Distributio

DATES.	Convicts.										Free Men.							Female Convicts.					Free Women.			Children	
	Chargeable to Imperial Funds.								Chargeable to Colonial Funds.		Chargeable to Imperial Funds.				Chargeable to Colonial Funds.			Chargeable to Imperial Funds.					Chargeable to Imperial Funds.			Imperial Funds.	
	Under Sentence of Penal Servitude or Imprisonment passed by Superior Courts.	On Probation for Ticket-of-Leave and Conditional Pardon.	Passholders under Sentence.	Passholders under Sentence illegally at large or otherwise unaccounted for.	Passholders under Sentence in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence earning their own livelihood.	Ticket-of-Leave Holders under Sentence in Hospital, Invalids, and Lunatics.	Under Sentence of Penal Servitude or Imprisonment passed by Superior Courts.	On Probation for Pardons.	Under Magisterial Sentence.	Paupers and Invalids.	In Hospital.	Lunatics.	Under Magisterial Sentence.	Paupers and Invalids.	Lunatics.	Under Sentence of Penal Servitude or Imprisonment passed by Superior Courts.	Passholders in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence earning their own livelihood.	Ticket-of-Leave Holders under Sentence in Hospital, Invalids, and Lunatics.	Paupers and Invalids.	In Hospital.	Lunatics.	Boys.	Girls.
1867.																											
31st December.	78	11	—	123	28	15	20	18	291	2	3	150	5	83	13	1	7	—	—	—	12	2	13	2	24	51	46
1865.																											
30th June.	72	11	—	113	28	13	21	20	269	2	1	167	1	81	12	1	6	—	—	—	11	—	15	1	24	46	46
Increase.	—	—	—	—	—	—	—	2	—	—	—	17	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—
Decrease.	6	—	—	10	—	2	9	—	22	—	2	—	4	2	1	—	1	—	—	—	1	2	—	1	—	5	—

ENERAL'S OFFICE.

EPARTMENT, 30th June 1868.

Civil Commandant.	Protestant Chaplain.	Roman Catholic Chaplain.	Assistant Magistrates.	Medical Officers.	Clerks.	Accountant of Stores.	Foreman of Works.	Schoolmaster and Schoolmistress.	Keepers.	Station Officer.	Keeper of Separate Prison.	Overseers.	Assistant Overseers.	Wardmaster.	Coxswains.	Dispenser.	Turnkeys and Warders.	Petty Constables.	Messengers.	Attendants.	Seamen, schooner "Harriet."	Signalman, Mount Augustus.'	Superintendent of Agriculture.	Store Keepers.	Writer.	Paid Mechanics.	STATIONS and ESTABLISHMENTS.
–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	Comptroller-General's Office.
1	1	1	2	2	2	1	1	2	3	1	1	8	10	1	4	1	4	65	–	12	5	1	1	2	1	12	Port Arthur.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Prisoners' Barracks.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Cascade Factory.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Watchhouses and Gaols.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Hospitals and Lunatic Asylum.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Queen's Orphan Asylum.
1	1	1	2	2	4	1	1	2	3	1	1	8	10	1	4	1	4	65	1	12	5	1	1	2	1	12	TOTAL.

C. T. BELSTEAD, for Comptroller-General (Sick).

EPARTMENT.

EPARTMENT on the 31st December 1867 and on the 30th June 1868.
eturns for those Periods.

Comptroller-General.	Civil Commandant.	Protestant Chaplain.	Roman Catholic Chaplain.	Assistant Magistrates.	Medical Officers.	Clerks.	Accountant.	Foreman of Works.	Schoolmaster and Schoolmistress.	Keepers.	Station Officer.	Keeper of Separate Prison.	Overseers.	Assistant Overseers.	Wardmasters.	Coxswains.	Dispenser.	Turnkeys and Warders.	Petty Constables.	Attendants.	Messengers.	Seamen, schooner "Harriet."	Signalman, Mount Augustus.	Writer.	Superintendent of Agriculture.	Store Keepers.	Paid Mechanics.	DATE.
																											1867.
1	1	1	1	2	2	4	1	1	2	3	1	1	8	11	1	4	1	5	68	13	2	5	1	1	1	2	9	31st December.
																											1868.
1	1	1	1	2	2	4	1	1	2	3	1	1	8	10	1	4	1	4	65	12	1	5	1	1	1	2	12	30th June.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	Increase.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	3	1	1	–	–	–	–	–	–	Decrease.

C. T. BELSTEAD, for Comptroller-General (Sick).

TASMANIA.

No. 3.

ABSTRACT showing the Number of Individuals of each Class at Port Arthur on the 30th June 1868, chargeable to Colonial and Imperial Funds respectively.

Station.	Colonial Funds.				Imperial Funds.				Grand Total.
	Under Sentence or Order of Probation.	Paupers and Invalids.	Lunatics.	Total Colonial.	Under Sentence or Order of Probation.	Paupers and Invalids.	Lunatics.	Total Imperial.	
Port Arthur - -	283	1	6	290	96	187	88	371	661

No. 4.

SUMMARY OF CONVICTS, 30th June 1868.

Males.

154	Passholders - -	Under sentence - - - -	Maintained by Government.	0
		On probation for pardons - - -		13
		In hospitals, invalids, and lunatics - -		28
		Illegally at large or otherwise unaccounted for	Not maintained by Government.	113
		Earning their own living - - - -		21
54	Ticket-of-leave holders - -	Under sentence - - - -	Maintained by Government.	13
		In hospitals, invalids, and lunatics - - -		20
341	- - - -	Under sentence of penal servitude or imprisonment - - - -		341
549				549

Females.

No Passholders.

11	Ticket-of-leave holders -	Earning their own livelihood - - -	Not maintained by Government.	11
11				11

Maintained by Government, males - - - -	415
Do. females - - - -	0
Not maintained by Government, males - - - -	134
Do. females - - - -	11
Grand total of Convicts - -	560

TASMANIA.

Civil Commandant's Office, Port Arthur,
29th July 1868.

SIR,

I HAVE the honour to submit my annual report upon the general establishment under my command for the year ended the 30th June 1868.

Conduct of the Subordinate Officers.

1. With a few exceptions the conduct of the officers has been quite satisfactory, and they have performed their duties in a correct and diligent manner.

2. The following changes have taken place, viz., one assistant overseer superannuated, and another dismissed. The master and mistress of the school for officers' children and the mate of the Government schooner resigned. All these vacancies have been filled up.

Civil Guard.

3. This force has faithfully and efficiently discharged the important duties intrusted to it.

State of the Buildings.

4. The new hospital for insane, adverted to in my last report as being in course of erection, has been completed, and is now occupied. It is found to afford excellent and cheerful accommodation for the afflicted inmates.

5. The other principal buildings are in good condition, but many of the officers' quarters and other minor wooden buildings require extensive repair, or to be rebuilt, several of them being very old and decayed.

The shingling of a large number of the houses at head quarters and at the out stations requires renewing. A new slaughter-house is also absolutely necessary.

6. A very considerable amount of alteration and repair to the buildings throughout the peninsula has been executed during the last 12 months, but it is hardly possible to prevent many of the old structures falling into a state of dilapidation, owing to the greatly reduced number of mechanics now available.

Conduct of the Prisoners.

7. The conduct of the prisoners, in general, has been satisfactory. The appended Return (A.) shows the number and nature of the offences committed by them, and how disposed of by the adjudicating magistrates, the number of offences being 104 upon an aggregate strength of 533. In my last report there were 146 offences, and a total of 592 prisoners. Two cases of absconding have to be recorded, but both prisoners were recaptured within 48 hours.

8. No serious crime has been charged against any of the convicts, but one of the free pauper class committed an aggravated assault upon a prisoner. He was sent before the Supreme Court, and sentenced to four years imprisonment.

9. Another offence, of a novel character, was committed by a convict invalid, who, upon hearing the intelligence of the attempted assassination of His Royal Highness the Duke of Edinburgh at Sydney in March last, made use of highly disloyal and exciting remarks, in the presence of a number of persons. He has since been confined in the separate prison, the strict discipline of which will, I hope, deter him from again making use of such improper and mischievous language whilst at this establishment.

Prisoners under Life Sentence.

10. The number of prisoners under sentence of "transportation," "penal servitude," or "imprisonment" for life is 81; of these 28 have either been positively ordered never to be released, or to be held for indefinite terms, and a considerable number of the others may be regarded as being in similar positions, owing to the heinous nature of their offences, and their general very bad and dangerous character.

11. At present there does not exist any means at Port Arthur for keeping this extreme and exceptional class separate from the other prisoners undergoing sentences for terms of years.

12. Repeated complaints have been made by the former as to their prolonged detention, and they have been told that the subject has been referred to the Home Government; many of them are, however, becoming restless, and as not a few have little to hope for from good conduct, I greatly apprehend that before long they may evince a spirit of insubordination and recklessness. It is, therefore, undoubtedly of the greatest importance, in order to guard against dangerous combinations and general excitement, that these men should be removed to a separate establishment as soon as practicable, and placed under a form of modified labour and discipline, with certain indulgences not extended to other prisoners.

13. Such a change would, in my opinion, go far towards reconciling them to their hopeless position, as they would see, by the comparative mildness of their treatment, that, although not allowed to be at large, their cases had received due and merciful consideration from the Government. I cannot but express my earnest hope that a change so obviously just and necessary may be conceded to these convicts as early as possible, in order to avert probable grave consequences, imperilling, perhaps, the lives of the officers and their families, and causing alarming apprehension to the inhabitants of the colony in general.

Dietary.

14. The new scales of dietary which, in conjunction with the medical officers, I had the honour to prepare and submit in the early part of last year, as directed, and which, having been approved of by his Excellency the Governor, came into operation on the 1st of May 1867, have been found a great improvement upon the old monotonous rations, being not only more acceptable to the inmates, by affording them certain simple changes of food, but much less expensive to the public.

Rules and Regulations.

15. The rules and regulations for the penal establishment on Tasman's Peninsula, which were approved in 1857, I have again thoroughly revised in accordance with your instructions, and they now await the formal sanction of his Excellency the Governor.

16. I shall also shortly complete the revisal of the numerous standing detail orders which I have found it necessary to issue during the last fifteen years nearly.

17. The regulations for the pauper and invalid depôt have been likewise revised and submitted for approval.

Increasing Age and Infirmities of the Prisoners, and the consequent Incapacity of many for Hard Labour.

18. As stated in my last annual report, very considerable difficulty has been felt in carrying on the various operations of the establishment, owing to the yearly increasing infirmities of a large proportion of the prisoners, who nearly all belong to the old often-convicted class. Tables B. and C. appended show a classification of their ages, and their labour capabilities as determined by the medical officers.

Removal of Prisoners.

19. Since the month of July last 122 prisoners chargeable to colonial funds have, to the 4th July 1868, been transferred to the prison at Hobart Town.

20. These men were all under reduced periods of detention, and on the whole well conducted here. Their removal has been attended with much inconvenience to the general establishment on Tasman's Peninsula, as they were the most useful and eligible class available for the various works and duties, both at head quarters and at the several outposts upon this extensive peninsula. This will be the more obvious when the general character of the prisoners remaining is considered, they being mainly composed of incorrigible dangerous men, and of others who are old, worn out, or imbecile.

SMANIA.

Employment of the Prisoners.

21. Appendix D. shows the different capacities in which the prisoners have been employed.
22. E. the quantities and value of farm, dairy, and other produce raised.
23. F. the quantities and value of building and other materials obtained.
24. G. the quantities of clothing and other stores made and repaired, and the amount of washing performed, with the value of the work.

Increasing difficulty in procuring good Timber.

25. I have again to point out that, in consequence of all the available good timber having been cut down near to head quarters, considerable difficulty has been experienced in keeping up the supply for the several public departments, as also for the use of the stations, particularly as the prisoners capable of performing this heavy labour have been so much reduced in number, and having mostly to walk about 7 miles daily in going to and returning from that part of the bush where alone suitable timber can now be obtained on the south side of the peninsula. The large quantity of firewood required for the prisoners and stipendiaries has also to be brought from the same locality.

Tannery.

26. The establishment of a tannery, noticed in my last report, has been attended with much success, a considerable quantity of leather having been produced, and as arrangements have been made to procure raw hides from the contractor, I shall be enabled to provide all the leather required for the prisoners, paupers, and lunatics, which I estimate will secure a saving of about 200*l.* per annum.

Transport.

27. The whole of the transport service between this establishment and Hobart Town is now carried on by the Government schooner. Through this alteration the hire of the private expensive steamer heretofore employed has been saved.

Prisoners' Money Earnings.

28. The maximum amount which any prisoner can now earn is limited to 1*s.* 5*d.* per month. A copy of the new scale will be found in Appendix H.

Fatal Accident.

29. Prisoner No. 10,354 was accidentally killed on the 9th of June last, by a tree falling upon him whilst at work in the bush. A coroner's inquest was held in the case, and a verdict returned as above.

General Observations.

30. Appendix I. gives the number of prisoners, paupers, and lunatics present on the 30th of June 1867 and 1868 respectively, with the funds to which each class was chargeable.
31. J. shows the number of prisoners received, discharged during the year, and remaining on the 30th June last.
32. K. indicates the mortality during the last 12 months, and the number of convict patients in hospital on 30th June 1868.
33. L. is a summary of the meteorological observations taken at Port Arthur during the period, and furnished to the Royal Society of Tasmania.
34. Appended also is a list of the principal visitors, with copies of their recorded observations. The small number shown in this report, as compared with former years, is owing to the discontinuance of steam communication, and the limited accommodation afforded by the Government schooner, thereby rendering access to the peninsula much less agreeable and convenient than formerly.
35. The governor inspected the establishment in the month of November last.
36. A copy of his Excellency's official minute will be found with the entries made by visitors, and, as will be seen, is of a most gratifying character, demanding my respectful gratitude for the most favourable manner in which my humble services have on the present, and all former occasions, been deemed deserving of his Excellency's approval and commendation.
37. In concluding this report I have also to acknowledge the high terms in which this establishment is referred to by the Home authorities on prison discipline in the digest and summary of answers from colonial governors to circular despatches 16th and 17th January 1867.
38. The prominent position, in the order of honourable mention, therein accorded to Port Arthur, out of the 35 colonies which furnished such answers to the Right Honourable the Secretary of State, has been, I am aware, as pleasing to the governor and yourself as, I need scarcely add, it is encouraging to me the chief officer of the institution.

I have, &c.

The Comptroller-General,
&c. &c.

(Signed) J. Boyd,
Civil Commandant.

A.

RETURN showing the NUMBER of PRISONERS under DETENTION at Port Arthur, and their CONDUCT during the Year ending 30th June 1868.

Aggregate Number of Prisoners at the Penal Settlement, Port Arthur, during the Year ending 30th June 1868.	Larceny under 5*l.*	Common Assault.	Insubordination.	Wilful Destruction of Government Property.	Wilful Prevarication on Oath.	Absconding.	Disobedience of Orders.	Idleness.	Neglect of Duty.	Drunkenness.	Insolence.	Absence without Leave.	Misconduct and other Breaches of Discipline.	Total No. of Offences committed.
Totals - 533	2	1	1	1	1	2	43	2	3	3	5	4	36	104

Offences.	Punishments.													Total.
	18 Months Hard Labour in Chains.	12 Months Hard Labour.	9 Months Hard Labour.	6 Months Hard Labour in Chains.	6 Months Hard Labour.	4 Months Hard Labour in Chains.	4 Months Hard Labour.	3 Months Hard Labour.	2 Months Hard Labour and above 1 Month.	1 Month Hard Labour and under.	1 Month and above 14 Days Solitary Confinement.	14 Days and above 7 Days Solitary Confinement.	7 Days and under Solitary Confinement.	Reprimanded.	
Larceny under 5*l.* -	—	—	—	—	—	—	—	—	—	—	—	—	1	2	2
Common Assault -	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1
Insubordination -	—	—	—	—	—	—	—	—	—	—	—	1	—	1	1
Wilful Destruction of Government Property.	—	—	—	1	—	—	—	—	—	—	—	—	—	1	1
Wilful Prevarication on Oath	—	—	—	—	—	—	—	—	—	—	—	1	—	1	1
Absconding - -	1	—	—	—	—	—	1	—	—	—	1	16	11	7	43
Disobedience of Orders -	—	—	1	2	—	1	1	—	2	2	—	2	1	—	2
Idleness - -	—	—	—	—	—	—	—	—	1	—	—	2	—	—	3
Neglect of Duty - -	—	—	—	—	—	—	—	—	—	—	—	2	—	—	3
Drunkenness - -	—	—	—	—	—	—	—	—	—	—	—	2	—	—	3
Insolence - -	—	—	—	—	—	—	—	1	—	—	—	1	1	2	5
Absence without Leave -	—	—	1	—	1	—	1	—	—	—	—	2	—	—	4
Misconduct and other Breaches of Discipline.	—	1	4	2	4	1	4	6	—	1	—	9	7	1	36
Totals -	1	1	1	3	9	2	6	7	4	3	1	36	20	10	104

B.

RETURN showing the Ages of the Prisoners (all classified).

Year.	Under 20 years.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	Total.
30th June 1868 -	1	6	60	155	107	44	6	379*

* Of the 379 Prisoners only 67 are under 40 years of age.

C.

RETURN showing the Labour Classes of the Prisoners.

Year.	1st Class.	2d Class.	3rd Class.	4th Class.	Total.	Remarks.
30th June 1868 -	188*	106	66	19	379	* Many of the first class men are under heavy sentences, and cannot be trusted off the Station.

D.

RETURN showing the various capacities in which the Prisoners have been employed during the year ending 30th June 1868.

Attendants on sick.
Bakers.
Blacksmiths.
Bookbinders.
Boat and launch repairers.
Brickmakers.
Bricklayers.
Butchers.
Barbers.
Bullock drivers.
Boatmen.
Carpenters.
Cooks.
Charcoal burners.
Coopers.
Cemetery keeper.
Church and chapel cleaners.
Carters.
Dairymen.
Engine driver.
Fitters and locksmiths.
Fencers.
Farriers.
Gardeners.
Herdsmen.
Harness makers and repairers.
Labourers, agricultural.
„ general.
Lime burners.
Laundrymen.
Land clearers.
Lamplighters.
Lime-shell gatherers.
Masons and stonecutters.
Moulders and foundrymen.
Mat makers.
Plumbers, painters, and glaziers.
Potters, making cell pans.
Plasterers.
Ploughmen.
Procurers of firewood.
„ logs.
„ spars.
„ boat and launch timbers.
Pile drivers.
Quarrymen.
Saddlers.
Sawyers and saw-mill men.
Servants.
Shinglers.
Shoemakers.
Splitters.
Stokers.
Sweeps.
Salt boilers.
Stone breakers.
Scavengers.
Signalmen.
Semaphore repairers.
Tanners.
Tool repairers.
Tailors.
Tin-plate workers.
Tramroad layers and repairers.
Writers.
Wheelwrights.
Watchmen assisting police.
Wardsmen and station cleaners.
Water carriers.
Wood carriers.
Wharf and jetty repairers.

E. TASMAN

RETURN showing the Quantity and Estimated Value at Contract and other Rates of Agricultural, Dairy, and other Produce during the Year, with the Amount paid for Labour by Stipendiaries.

PRODUCE.			Quantity.	Price at per	Amount. £	s.	d.
Butter		Lbs.	1,072¼	1s. 10d.	98	5	9½
Eggs		No.	12,216	1s. 4d. doz.	67	17	4
Milk		Pts.	38,853¼	1½d. pt.	242	16	8
Fowls		No.	63	2s.	6	6	0
Fresh Meat	Beef	Lbs.	6,083¼	5½d.	139	8	2
	Veal	„	137¼	5½d.	3	2	11
	Mutton	„	1,216½	5½d.	27	17	8
	Venison	„	121⅛	5½d.	2	15	8¼
	Pork	„	6,209½	5½d.	142	6	1½
Bacon		„	3,565⅛	10d.	148	11	3
Ditto		„	815⅛	9d.	30	11	7
Suet		„	153¼	10d.	6	7	8½
Ditto		„	34	7d.	0	19	10
Black Oil		Pts.	400	4s. gal.	10	0	0
Salt		Lbs.	8,258	4s. 3d. per 100 lb.	17	10	11½
Ditto		„	2,750	4s. 6d. „	6	3	9
Wool		„	1,092	1s.	54	12	0
Vegetables — Potatoes	For Rations and Seed	„	196,967	4s. 8d. per 100 lb.	459	11	9½
	Ditto	„	50,418⅛	5s. 6d. „	138	13	0¼
	Inferior, for Stock	„	36,128	2s. 4d. „	42	2	11¾
	Ditto	„	19,069	2s. 9d. „	26	4	4¾
Vegetables — Green	For Rations	„	49,301	4s. 8d. „	115	0	8½
	Ditto	„	16,194	5s. 6d. „	44	10	8
	Inferior, for Stock	„	6,860	2s. 4d. „	8	0	0¾
	Ditto	„	33,497	2s. 9d. „	46	1	2
Wheat		„	38,157	7l. bush.	222	11	8
Hay		„	155,678	4l. ton.	277	19	11
Straw		„	44,442	2l. „	39	13	7¼
Green Fodder		„	175,140	1l. 5s. „	97	14	8¼
Mangel Wurzel		„	82,040	1l. 10s. „	54	18	9
Barley		„	1,270	4s. 6d. bush.	5	14	3½
Oats		„	17,315	3s. „	64	18	7½
Tares		„	925	5s. „	3	17	1
Peas, White		Bush.	24¾	6s. „	7	8	6
Peas, Field		„	189 13/30	3s. 6d. „	33	3	0
Beans, Broad		„	42 7/15	7s. „	14	17	3
Beans, Horse		„	121 47/60	3s. 6d. „	21	6	3
Rye		Lbs.	522	1d. lb.	2	3	6
SEEDS, &c.							
Mangel Wurzel		„	3	2s. 6d. lb.	0	7	6
Turnip		„	7	1s. 4½d. „	0	9	7½
Leek		„	6/16	6s. „	0	2	3
Carrot		„	14 5/16	4s. „	2	17	3
Cabbage		„	4 3/16	4s. 6d. „	1	0	3
Leather, various, manufactured					32	1	10¾
Skins ditto					0	18	0
SHEEP AND CATTLE SOLD TO CONTRACTOR.							
Cattle					74	0	0
Sheep					47	0	10
Labour paid for by Stipendiaries					147	2	7½
				Total	3,038	5	7

SMANIA.

F.

RETURN showing the quantity of Timber, sawn or split, Piles, Spars, Bricks, and other materials, Fuel, &c. procured during the year ended 30th June 1868, with the value of the same at Prison rates.

ARTICLE.	Quantity.	Price at per	Amount. £	s.	d.
Beams and other large timber - - - Feet	3,168	4s. per 100 ft.	6	6	8½
Joists - - - - - - „	44,501 10	„	89	0	0¾
Quartering - - - - - - „	55,347	„	110	13	10½
Planks - - - - - - „	7,794 6	„	15	11	9¼
Boards - - - - - - - „	78,851 7	„	157	14	0¾
Battens - - - - - - „	25,857 6	„	51	14	3½
Posts - - - - - - - „	26,607	„	53	4	3¼
Coffin boards - - - - - „	817 3	„	1	12	8¼
Felloes - - - - - - No.	65	4d. each	1	1	8
Posts and Rails - - - - „	9,032	7s. 10½d. per 100	35	11	3¼
Lightwood boards - - - - Feet	2,208 4	6s. per 100 ft.	6	12	6
Do. quartering - - - - „	25 6	„	0	1	6¼
Arras Rails - - - - - „	10,348 6	4s. per 100 ft.	20	13	11¼
Gum Spokes - - - - - No.	300	4d. each	5	0	0
Split palings, 5 feet - - - - „	1,800	5s. 9d. per 100	5	3	6
Do. 6 feet - - - - - „	7,250	7s. 6d. per 100	27	3	9
Shingles - - - - - - „	256,200	7s. per 1,000	89	13	4¾
Firewood, General Establishment - - Tons	3,899	5s. per ton	974	15	0
Do. in billets - - - - Lbs.	48,500	7s. 6d. per ton	8	2	4½
Charcoal - - - - - Bushels	2,778	9d. per bushel	104	3	6
Split palings, 8 feet - - - - No.	572	12s. per 100	3	8	7½
Laths - - - - - - „	5,000	5s. 6d. per 1,000	1	7	6
Staves, lightwood - - - - „	860	2d. each.	7	3	4
Piles, 28 feet long, 12″ to 14″ - - „	22	14s. each	15	8	0
Do. 25 „ 12″ - - - „	10	12s. 6d. each	6	5	0
Do. 21 „ 15″ to 18″ - - „	63	10s. 6d. each	33	1	6
Scaffold poles, 40 feet long - - - „	40	5s. each	10	0	0
Flag-staffs and caps, 46 feet - - - „	6	3s. 6d. each	1	1	0
Do. Do. 12 „ - - - „	18	1s. each	0	18	0
Do. Do. 25 „ - - - - „	13	2s. each	1	6	0
Do. Do. 40 „ - - - - „	12	3s. each	1	16	0
Do. and caps dressed, 45 feet - - „	14	6s. each	4	4	0
Do. Do. 25 „ - - - „	12	3s. 6d. each	2	2	0
Bricks - - - - - - „	70,175	25s. per M.	87	14	4½
Sandstone, rough - - - - Cubic ft.	480	3d. cubic foot	6	0	0
Do. dressed - - - - - „	90	1s. 5d. cubic foot	6	7	6
Do. guttering - - - - Super. ft.	20	10d. per foot	0	16	8
Whinstone - - - - - Cubic yd.	16	6s. cubic yard	4	16	0
Flagging - - - - - Super. ft.	285	1s. per foot.	14	5	0
Tiles, draining - - - - - No.	1,570	20s. per 100	15	14	0
Lime shell - - - - - - Bushels	1,430	1s. per bushel	71	10	0
Coffins - - - - - - - No.	24	4s. each	4	16	0
Small wood in billets for lighting fires for the Military, &c. - - - - - Lbs.	32,396	½d.	67	9	10
		Total -	£2,131	10	5¾

G.

RETURN showing the Number and Description of all Articles of Clothing and other stores made or repaired during the year ending 30th June 1868, with the value of such work at prison rates, and also the quantity of Washing performed for the prisoners, with its value:—

ARTICLE.		No.	Rate.			Amount.		
			£	s.	d.	£	s.	d.
Boots, made	Prs.	404	0	3	9	75	15	0
„ remade	„	573	0	2	9	78	15	9
„ rebottomed	„	513	0	2	6	64	2	6
„ repaired	„	63	0	2	0	6	6	0
„ branded by cut and stitch	„	654	0	0	3	8	3	6
Slippers, hospital, made	„	65	0	1	0	3	5	0
„ „ rebottomed	„	28	0	0	9	1	1	0
„ „ repaired	„	12	0	0	6	0	6	0
„ cloth, made	„	202	0	1	0	10	2	0
Trousers, grey, made	„	400	0	1	6	30	0	0
„ blue cloth, made	„	32	0	1	6	2	8	0
„ fly'd for chains	„	78	0	0	6	1	19	0
Jackets, grey, made	No.	28	0	1	6	2	2	0
„ blue cloth, made	„	32	0	1	6	2	8	0
Vests, grey, made	„	354	0	0	9	13	5	6
„ blue cloth, made	„	32	0	0	9	1	4	0
Shirts, flannel, made	„	294	0	1	0	14	14	0
„ „ repaired	„	263	0	0	6	6	11	6
„ cotton, made	„	655	0	1	0	32	15	0
Frocks, blanket, for winter, made	„	210	0	0	9	7	17	6
Drawers, flannel, made	Prs.	186	0	1	0	9	6	0
„ „ repaired	„	90	0	0	6	2	5	0
„ blanket, made	„	210	0	1	0	10	10	0
Socks, blanket, repaired	„	288	0	0	1	1	4	0
Stockings, repaired	„	84	0	0	3	1	1	0
Caps, cloth, made	No.	183	0	0	6	4	11	6
Pads for irons, made	„	49	0	0	6	1	4	6
Belts, cloth, made	„	77	0	0	8	2	11	4
„ leather, made	„	54	0	0	3	0	13	6
Braces, made	Prs.	146	0	0	4	2	8	8
Bags, wool, made	No.	3	0	1	6	0	4	6
Blinds, window, made	„	12	0	0	6	0	6	0
Flags, signal, made	„	14	0	5	0	3	10	0
Flags (Union Jack), large, made	„	10	0	6	0	3	0	0
„ signal, repaired	„	7	0	2	0	0	14	0
Mill bands, made	„	1	0	15	0	0	15	0
„ repaired	Ft.	320	0	0	3	4	0	0
Hammock straps, made	No.	27	0	0	6	0	13	6
„ repaired	„	150	0	0	3	1	17	6
Holsters, repaired	„	6	0	0	6	0	3	0
Pouches, repaired	„	8	0	0	6	0	4	0
Trusses, repaired	„	17	0	0	9	0	12	9
Belly band, made	„	1	0	1	3	0	1	3
Saddles, cart, repaired	„	3	0	1	6	0	4	6
Collars, horse, repaired	„	13	0	1	6	0	19	6
„ cow, made	„	7	0	0	6	0	3	6
Horse cloths, repaired	„	2	0	0	6	0	1	0
Straps, stirrup, repaired	„	2	0	0	3	0	0	6
„ harness, repaired	„	10	0	0	2	0	1	8
Bridles, made	„	3	0	2	6	0	7	6
„ repaired	„	2	0	1	0	0	2	0
Harness, sets, cart, repaired	„	4	0	6	0	1	4	0
Cart cover, made	„	1	0	1	0	0	1	0
Cloths, table, made	„	1	0	0	4	0	0	4
Mats, grass, made	„	281	0	1	0	14	1	0
„ table, made	„	21	0	0	3	0	5	3
„ boat	„	1	0	2	6	0	2	6
Matting, yards, made	„	104	0	0	6	2	12	0
Baskets, made	„	406	0	1	0	20	6	0
Brooms, made	„	1,248	0	0	6	31	4	0
Oakum, picked	Lbs.	601	0	0	4	10	0	4
Buckets, water, made	No.	18	0	1	6	1	7	0
„ „ repaired	„	13	0	0	9	0	9	9
Close stools, made	„	36	0	5	0	9	0	0
Harness cask, made	„	1	0	2	6	0	2	6
Chairs, lightwood, made	„	25	0	6	0	7	10	0
Horse cart, made	„	1	6	0	0	6	0	0
Bullock cart, made	„	1	7	0	0	7	0	0
Tubs, butter, made	„	14	0	1	9	1	4	6
„ urine, made	„	36	0	1	9	3	3	0
„ „ repaired	„	40	0	0	9	1	10	0

TASMANIA.

Article.	No.	Rate.	Amount.
		£ s. d.	£ s. d.
Water kits, made - - - No.	6	0 1 0	0 6 0
Kettles, camp, tin, made - - „	44	0 2 0	4 8 0
„ bush, tin, made - - „	67	0 0 9	2 10 3
Covers for milk dishes, tin, made - „	20	0 0 6	0 10 0
Pans, close stool - - - „	58	0 1 0	2 18 0
Kettles, cans, &c., repaired - „	114	0 0 6	2 17 0
Hinges, brass, made - - - Prs.	21	0 0 6	0 10 6
Dishes, meat, tin, made - - No.	18	0 0 9	0 13 6
Watering pot, tin, made - - „	1	0 2 6	0 2 6
Colander, tin, made - - „	1	0 1 0	0 1 0
Basin, tin, made - - - - „	1	0 0 9	0 0 9
Lamps, tin, made - - - „	5	0 1 0	0 5 0
Cans, treacle, &c., tin, made - „	31	0 0 9	1 3 3
Dippers, tin, made - - „	4	0 0 9	0 3 0
Kettle, tin, made - - - „	1	0 2 6	0 2 6
Measures for hospital, tin, made - „	12	0 0 3	0 3 0
Boiler for scalding milk, tin - „	1	0 5 0	0 5 0
Lamps, repaired - - - „	36	0 1 0	1 16 0
Pan, copper, for bookbinder - „	1	0 0 8	0 8 0
Launches, repaired - - „	9	—	22 12 0
Boats, repaired - - - - „	3	—	3 6 0
Schooner, repainted - - „	1	—	2 10 0
Clothes, washed - - Doz.	7,749	0 0 11	355 3 3
Bedding, washed, blankets - „	161 10/12	0 3 0	24 5 6
„ „ rugs - - „	5	0 3 0	0 15 0
Total - -			£961 16 7

H.

SCALE of Prisoners Earnings.

Sentence.	Maximum Rate per Month.	Maximum Amount allowed.	Remarks.
		£ s. d.	
Life - - -	1s. 1d.	9 15 0	After 15 years detention.
20 years - - -	1s. 1d.	9 0 0	
15 „ - - -	1s. 5d.	8 10 0	
20 „ - -	1s. 5d.	7 10 0	
10 „ - - -	1s. 5d.	6 10 0	
8 „ - - -	1s. 5d.	5 0 0	
7 „ - - -	1s. 5d.	4 8 0	
6 „ - - -	1s. 5d.	3 15 0	
5 „ - - -	1s. 5d.	3 6 0	
4 „ - - -	1s. 5d.	2 10 0	
3 „ - -	1s. 5d.	2 0 0	
2 „ - -	1s. 5d.	1 5 0	Shorter sentences than 2 years not to exceed 1s. 3d. per month.

I.

RETURN showing the Number of Effective Prisoners, Invalids and Insane Prisoners, Paupers, and Lunatics, with the Funds upon which they were borne on the 30th June 1867 and 30th June 1868 respectively.

Date.	Effective Prisoners Chargeable to Imperial Treasury.	Effective Prisoners Chargeable to Colonial Treasury.	Invalided and Insane Prisoners Chargeable to Imperial Treasury.	Invalided and Insane Prisoners Chargeable to Colonial Treasury.	Total Number of Prisoners.	Paupers Chargeable to Imperial Treasury.	Paupers Chargeable to Colonial Treasury.	Lunatics Chargeable to Imperial Treasury.	Lunatics Chargeable to Colonial Treasury.	Total of all Classes.	Funds.	
											Imperial.	Colonial.
Strength on 30th June 1867.	92	374	15	13	494	182	56	86	4	822	375	447
Strength on 30th June 1868.	84	276	12	7	379	187	1	88	6	661	371	290

J.

RETURN showing the Number of Prisoners received, discharged, and transferred to Colonial Establishments during the year ending 30th June 1868, with classification of the sentences of the former.

Number of Prisoners received.	Number of Prisoners discharged.	Transferred to Colonial House of Correction, Hobart Town.	Classification of Sentences.									Total.
			Under 2 Years.	2 Years and under 4 Years.	4 Years and under 6 Years.	6 Years and under 8 Years.	8 Years and under 10 Years.	10 Years and under 12 Years.	12 Years and under 14 Years.	14 Years and under 16 Years.	Life.	
66	71	110*	4	11	24	5	6	9	1	3	3	66

* Since the 30th June 12 more prisoners have been transferred to the House of Correction at Hobart Town, making in all 122 removed to that establishment to date of report.

K.

RETURN showing the average Number of Effective Prisoners, Invalids, Paupers, and Lunatics for the Year ending 30th June 1868, the Mortality during the Period, Average Age of each Class at Death, and present Number in Hospital.

Period.	Average Number of each Class.				Mortality during the Year.			Average Age of Prisoners at Death.	Average Age of Paupers, Invalided Prisoners, and Lunatics at Death.	Number in Hospital on 30th June 1868.	
	Effective Prisoners under Detention.	Paupers and Invalided Prisoners.	Lunatics.	Total.	Prisoners under Detention.	Paupers, Invalided Prisoners, and Lunatics.	Total.			Prisoners under Detention.	Paupers, Invalided Prisoners, and Lunatics.
From 1st July 1867 to 30th June 1868.											
Total - -	392	208	98	698	5* or 1¼ per cent.	18 or 6 per cent.	23	49⅘†	71‡	19	163

* One of these men, No. 10,354, was accidentally killed by a tree falling upon him.
† Two of the prisoners were above 60 years of age.
‡ Fifteen of the invalids, paupers, and lunatics were above 60 years of age.

L.

Observatory, Port Arthur, 30th June 1868.

Latitude 43° 9′ 6″ South. Longitude 147° 51′ 31″ East. Height above the Sea, 55 feet.

SUMMARY of the Meteorological Observations taken at Port Arthur, Tasman's Peninsula, from 1st July 1867 to 30th June 1868.

Date, 1867 & 1868.	Pressure of Air.		Temperature.		Moisture.		Rain in Inches.	Spontaneous Evaporation.	Ozonometer.	Prevailing Currents of Wind.
	Mean Reading of Barometer.	Pressure of Dry Air.	Mean Reading of Thermometer. Dry Bulb.	Mean Reading of Thermometer. Wet Bulb.	Humidity.	Dew Point.				
July -	29·628	29·363	50·60	46·07	·718	41·8	3·65	1·08	5·78	S.W. & N.W.
August -	29·798	29·531	52·43	47·07	·683	41·9	2·29	1·25	no test papers.	S.W. & W.
September	29·591	29·305	53·02	48·21	·713	43·0	5·79	1·17	do.	S.W. & W.
October -	29·620	29·347	55·56	48·69	·624	41·3	1·95	1·40	do.	S.W. & W.
November	29·648	29·361	57·40	50·21	·613	43·6	1·32	1·69	do.	S.W. & W.
December	29·559	29·244	58·86	52·19	·639	46·6	2·89	1·50	4·54	S.E. & W.
January -	29·760	29·417	58·54	53·22	·693	50·4	2·03	1·56	4·46	S.E. & S.
February -	29·820	29·450	61·12	55·47	·684	49·8	1·26	1·80	4·62	S. & S.W.
March -	29·785	29·427	61·36	54·78	·662	47·9	1·76	1·79	4·90	S.W. & N.W.
April -	29·780	29·473	56·24	50·53	·682	44·4	3·63	1·50	4·51	S.W. & N.W.
May -	29·942	29·640	54·76	49·73	·706	44·1	1·24	·90	4·85	S.W. & N.W.
June -	29·742	29·453	51·08	47·45	·764	42·8	2·30	·70	4·98	S.E. & N.W.
Sums	356·673	353·011	670·97	603·62	8·181	537·6	30·11	16·34	38·64	
Means	29·722	29·417	55·91	50·30	·681	44·8	2·50	1·36	4·83	

Tasmania.

Extracts from the Visitors' Book.

Memorandum for the Civil Commandant from his Excellency the Governor.

I have visited the prisoners and carefully inspected the establishment, and have only to repeat my continued entire approval of all I have seen.

The machinery made, and other improvements introduced, since I first visited Port Arthur, and the order steadily maintained without undue severity, reflect the highest credit on Mr. Boyd, the Civil Commandant, and entitle him to my warmest thanks.

Port Arthur, November 11, 1867. (Signed) T. Gore Browne.

(Signed) R. H. Vivian, Captain and Brevet-Major 14th Regiment, Commanding H.M. Forces in Tasmania.
J. G. Maycock, Major Commanding Detachment 14th Regiment, Hobart Town.
E. Fairtlough, Captain, 14th Regiment.
T. T. N. Brooke, Lieutenant, 14th Regiment.
L. Kirkpatrick Howat, Lieutenant, 14th Regiment.
W. B. Churchward, Lieutenant, 14th Regiment.
November 11, 1867. J. G. Cookson, Lieut.-Colonel, Madras Cavalry.

Visited the library, and was very much pleased with the contents, and thankful for the kindness shown by the officer.

(Signed) Charles G. Bodge, Melbourne.
F. Jacomb Hood, London, England.
Geo. Burn, Auctioneer, Hobart Town.
Henry Wilson.
March 5, 1868. L. W. Honey.

Arrived here 5th March 1868. Much pleased with the establishment.

(Signed) Alfred Crisp.
A. Inglis Clark.

The undersigned having inspected the various arrangements of the settlement at Port Arthur, have much pleasure in testifying to the admirable manner in which it is conducted, both as to the safety and comfort of the prisoners. The lunatic ward and the infirmary are especially gratifying to all philanthropists.

(Signed) G. Orton Babtie, Wahgunyah, Victoria.
March 5, 1868. George Rutherford, Peechelba, Victoria.

We arrived at Port Arthur yesterday in the "Marie Louise" on a fishing excursion, and having received permission from the Commandant to land, were shown every possible attention and kindness by the Commandant and his officials. The beauty of the Port breaking so suddenly on our view, after leaving the abrupt and rugged scenery between Cape Raoul and Brown Mountain, was grateful in the extreme.

The cleanliness and orderly disposition of the buildings on the establishment, pleased us very much, and the library was an unexpected treat indeed. We cannot but record our thanks to the Commandant for the kind treatment we have received on all hands.

(Signed) H. Sunderland Barrett, junior, A.A.
Edwd. V. Giblin, A.A.
Jno. Thos. Morriss, A.A.
W. Morriss, A.A.
J. G. Davies.
Ca. Salier.
Hy. Evans, Launceston.
April 13, 1868. W. M. Speer, Sydney, New South Wales.

(True extract.)

J. Boyd,
Civil Commandant.

No. 3.

No. 3.

Copy of a DESPATCH from Governor Du Cane to the Right Honourable the Earl Granville, K.G.

No. 10. Government House, Tasmania,
February 17, 1869.

My Lord,

I have the honour herewith to forward the usual returns for the half year ending the 31st of December last, showing the numbers and description of convicts and other prisoners chargeable to the Imperial funds.

I have, &c.

The Right Hon. (Signed) CHARLES DU CANE,
The Earl Granville, K.G., Governor.
&c. &c. &c.

Return of Distribution and Strength of Convict Department for Half Year ending 31st December 1868.

TASMANIA.—COMPTROLLER-

No. 1.—DISTRIBUTION RETURN of CONVICT

STATIONS AND ESTABLISHMENTS.	Convicts.								Free Men.						Female Convicts.				Free Women.			Children.	
	Chargeable to Colonial Funds.		Chargeable to Imperial Funds.						Chargeable to Imperial Funds.				Chargeable to Colonial Funds.			Chargeable to Imperial Funds.			Chargeable to Imperial Funds.			Imperial.	
	Under Sentence of Penal Servitude or Imprisonment passed at Superior Courts.	Under Probation for Pardons.	Under Sentence of Penal Servitude from Superior Courts.	On Probation for Tickets-of-Leave or Pardon.	Passholders under Sentence.	Passholders under Sentence in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence in Hospital, Invalids, and Lunatics.	Under Magisterial Sentence.	Paupers and Invalids.	In Hospital.	Lunatics.	Under Magisterial Sentence.	Paupers and Invalids.	Lunatics.	Under Sentence of Penal Servitude Superior Courts.	Passholders in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence in Hospital, Invalids, and Lunatics.	Paupers and Invalids.	In Hospital.	Lunatics.	Boys.	Girls.
Comptroller-General's Office	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Port Arthur	241	2	55	8	1	26	10	8	1	159	—	69	8	1	6	—	—	—	—	—	—	—	—
	5 Invalids. 3 Lunatics.		9 Invalids. 2 Lunatics.																				
Prisoners' Barracks	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cascade Factory	—	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—	2	15	—	—	—
Watch-house and Gaol	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Hospitals and Lunatic Asylum.	—	—	—	—	—	1	—	—	—	—	4	16	—	—	—	—	—	—	—	—	2	24	—	—
Queen's Orphan Asylum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	37	39
TOTAL	249	2	66	8	1	27	10	8	3	167	4	85	8	1	6	—	—	—	2	15	2	24	37	39

Total Convicts maintained by Government - - 371
Passholders illegally at large, or otherwise unaccounted for - - - - - - 105
Ticket-of-Leave Holders earning their own living 23
Total Males - - 499

Females - 10

Total Males and Females - 509

TASMANIA.—CONVICT

No. 2.—RETURN showing the STRENGTH of the CONVICT Taken from the Distribution

DATES. 1868.	Convicts.										Free Men.							Female Convicts.					Free Women.			Children.	
	Chargeable to Imperial Funds.								Chargeable to Colonial Funds.		Chargeable to Imperial Funds.				Chargeable to Colonial Funds.			Chargeable to Imperial Funds.					Chargeable to Imperial Funds.			Imperial.	
	Under Sentence of Penal Servitude or Imprisonment from Superior Courts.	On Probation for Ticket-of-Leave or Conditional Pardon.	Passholders under Sentence.	Passholders illegally at large or otherwise unaccounted for.	Passholders in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence earning their own livelihood.	Ticket-of-Leave Holders under Sentence in Hospital, Lunatics, or Invalids.	Under Sentence of Penal Servitude or Imprisonment passed by Superior Courts.	On Probation for Pardons.	Under Magisterial Sentence.	Paupers or Invalids.	In Hospital.	Lunatics.	Under Magisterial Sentence.	Paupers or Invalids.	Lunatics.	Under Sentence of Penal Servitude or Imprisonment passed by Superior Courts.	Passholders in Hospital, Invalids, and Lunatics.	Ticket-of-Leave Holders under Sentence.	Ticket-of-Leave Holders under Sentence earning their own livelihood.	Ticket-of-Leave Holders under Sentence in Hospital, Invalids, and Lunatics.	Paupers and Invalids.	In Hospital.	Lunatics.	Boys.	Girls.
1868.																											
30th June.	72	11	—	113	28	13	21	20	269	2	1	167	1	81	12	1	6	—	—	—	11	—	15	1	24	46	46
31st December.	66	8	1	105	27	10	23	8	249	2	3	167	4	85	8	1	6	—	—	—	8	2	15	2	24	37	39
Increase.	—	—	1	—	—	—	2	—	—	—	2	—	3	4	—	—	—	—	—	—	—	2	—	1	—	—	—
Decrease.	6	3	—	8	1	3	—	12	20	—	—	—	—	—	4	—	—	—	—	—	3	—	—	—	—	9	7

GENERAL'S OFFICE.

DEPARTMENT, 31st December 1868.

Stations and Establishments.	Acting Comptroller-General.	Superintendent of Agriculture.	Paid Mechanics.	Writers.	Store Keepers.	Signalman, Mount Augustus.	Seamen, schooner "Harriet."	Attendants.	Petty Constables.	Messengers.	Turnkeys and Warders.	Dispenser.	Coxswains.	Wardmaster.	Assistant Overseers.	Overseers.	Keeper, Separate Prison.	Station Officer.	Keepers.	Schoolmaster and Mistress.	Foreman of Works.	Accountant.	Clerks.	Medical Officers.	Assistant Magistrates.	Roman Catholic Chaplain.	Protestant Chaplain.	Civil Commandant.	Comptroller-General.
Colonial Establishments.	1	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1 on leave	–	–	–	–	–	–
	–	1	3	1	2	1	5	12	66	–	4	1	4	–	9	8	1	1	3	2	1	1	1	2	2	1	1	–	1
	1	1	3	1	2	1	5	12	66	1	4	1	4	1	9	8	1	1	3	2	1	1	2	2	2	1	1	1	1

C. T. BELSTEAD, Acting Comptroller-General.

DEPARTMENT.

DEPARTMENT on the 30th June and the 31st December 1868.
Returns for those Periods.

Dates. 1868.	Acting Comptroller-General.	Paid Mechanics.	Store Keepers.	Superintendent of Agriculture.	Writers.	Signalman, Mount Augustus.	Seamen, schooner "Harriet."	Messenger.	Attendants.	Petty Constables.	Turnkeys and Warders.	Dispenser.	Coxswains.	Wardmaster.	Assistant Overseers.	Overseers.	Keeper, Separate Prison.	Station Officer.	Keepers.	Schoolmaster and Schoolmistress.	Foreman of Works.	Accountant of Stores.	Clerks.	Medical Officers.	Assistant Magistrates.	Roman Catholic Chaplain.	Protestant Chaplain.	Civil Commandant.	Comptroller-General.
30th June.	–	12	2	1	1	1	5	1	12	65	4	1	4	1	10	8	1	1	3	2	1	1	4	2	2	1	1	1	1
31st December.	1	12	2	1	1	1	5	1	12	66	4	1	4	1	9	8	1	1	3	2	1	1	3	2	2	1	1	1 on leave	1
Increase.	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Decrease.	–	9	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–

C. T. BELSTEAD, Acting Comptroller-General.

ASMANIA.

No. 3.

ABSTRACT showing the Number of Individuals of each Class at Port Arthur on the 31st December 1868, chargeable to Colonial and Imperial Funds respectively.

Station.	Colonial Funds.				Imperial Funds.				Grand Total.
	Under Sentence or on Probation.	Paupers and Invalids.	Lunatics.	Total Colonial.	Under Sentence or on Probation.	Paupers and Invalids.	Lunatics.	Total Imperial.	
Port Arthur -	259	1	6	266	86	175	87	348	614

No. 4.

SUMMARY OF CONVICTS, 31st December 1868.

Males.

143 Passholders - -	Under sentence - - - -	Maintained by Government.	1
	On probation - - - -		10
	In hospitals, invalids, and lunatics - -		27
	Illegally at large or otherwise unaccounted for	Not maintained by Government.	105
41 Ticket-of-leave holders	Earning their own living - - -		23
	Under sentence - - - -	Maintained by Government.	10
	In hospitals, invalids, and lunatics - -		8
315 Miscellaneous - -	Under sentence of penal servitude or imprisonment - - - -		315
499			499

Females.

No passholders.

10 Ticket-of-leave - -	Invalids, maintained by Government - -		2
	Earning their own living, and not maintained by Government - - - -		8
10			10

Maintained by Government, males - - - -	371
Do. females - - -	2
Not maintained by Government, males - - -	128
Not Do. females - - -	8
Total, males and females - - -	509

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For Her Majesty's Stationery Office.

CONVICT DISCIPLINE (WESTERN AUSTRALIA AND TASMANIA).

ANNUAL REPORTS ON THE CONVICT ESTABLISHMENTS

AT

WESTERN AUSTRALIA

AND

TASMANIA.

Presented to both Houses of Parliament by Command of Her Majesty, 1869.

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